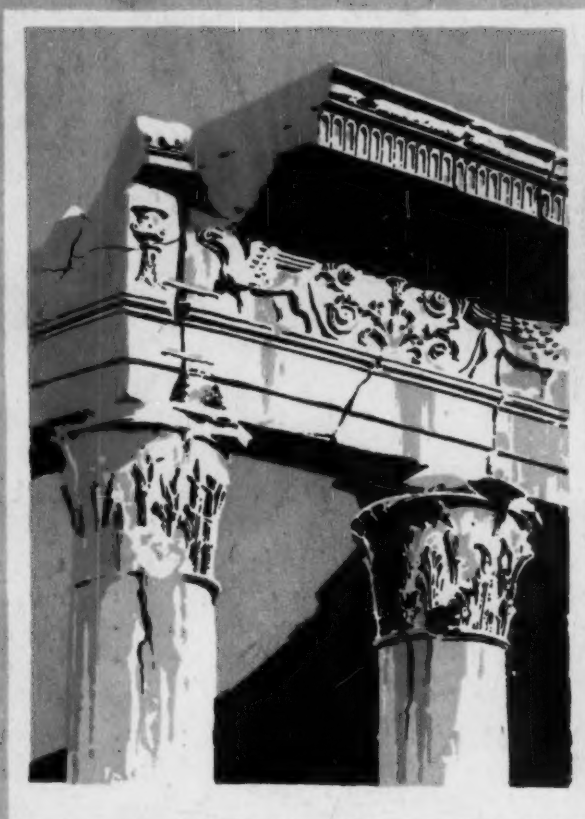
THE ARCHITECTURAL FORUM



MAY
1922

FOR GRAPHIC ACCOUNT OF BUILDING CONDITIONS, SEE SERVICE SECTION

Floor treated with Hard-n-tyte A. M. CASTLE STEEL COMPANY, CHICAGO, ILL. R. G. SCHMIDT, *Architect.* FEDERAL CEMENT TILE COMPANY, *Contractors for Concrete Floor Finish.*

REST HOUSE ON THE ROAD TO A HILLSIDE TEMPLE, NEAR HANGCHOW

Vermilion columns and beams of brilliant green, blue, red, yellow and gold support a roof of neutral gray tile for the shelter of wayfarers. Painted symbolism and religious admonitions add to the decoration.

Photographed by Edwin L. Howard

The
ARCHITECTURAL FORUM

VOLUME XXXVI | MAY 1922 | NUMBER 5

The Architect's Agreements with the Owner

PART I. ESTABLISHMENT OF BUSINESS UNDERSTANDING REGARDING SERVICE AND METHOD OF PAYMENT

By C. STANLEY TAYLOR

NOT A LEGAL TREATISE!

IT is not the purpose of this article to express in dry legal terms or in difficult phraseology opinions on the legality of the contractual relationship between the architect and his client.

It is a direct businesslike discussion of a subject which the architect usually approaches with hesitation and a certain laxity which often brings unfortunate misunderstandings and direct financial loss.

We believe that the value of proper legal service is not thoroughly appreciated by the architectural profession and that a few simple legal precautions at the beginning of the relationship between the architect and his client will constitute a valuable form of insurance which will be appreciated by both parties. This article will be concluded in the June issue.

WITHIN the past few weeks there have been received in the editorial offices of THE ARCHITECTURAL FORUM several letters asking advice in cases where misunderstandings have arisen between architects and their clients in regard to certain phases of the business arrangements made on specific projects.

These misunderstandings, which threaten to develop into legal procedure, have been the result of failure to establish proper agreements covering such specific questions as these:

1. In case the architect is retained to design a building on which the owner has already given a specific cost limitation, what is the legal position of the architect if it is found that the cost runs considerably over this figure when bids are taken?
2. How much of his fee can the architect collect in case a building project is abandoned?
3. What is the architect's position in the matter of collecting his fees if construction is unreasonably delayed?
4. What is the architect's position when a building project is transferred from a promoter to another owner?

These typical questions serve to indicate that in actual practice such difficulties may easily arise, even with good faith on the part of both parties in the transaction. It is evident, therefore, that this subject is one worthy of serious consideration by every architect, and the purpose of this article is to present the more usual points of disagreement and suggested methods of avoiding any possibility of such disagreement by establishing a thorough understanding in advance between the architect and his client.

In order to present this information in the most practical form, the subject has been discussed personally and through correspondence with a number of leading architects who have willingly cooperated by providing us with descriptions of such methods as may have proven valuable to them in creating proper business relationships with clients. William Law Bowman, attorney of New York City, who has contributed extensively to the columns of THE FORUM on legal subjects and whose legal opinions are quoted liberally in the Hand-Book of Architectural Practice (American Institute of Architects), has also provided some valuable points for this discussion.

As explained in several of the letters which we have received on this subject, the discussion of fees and methods of payment is usually somewhat embarrassing to the architect to an extent that he often fails to provide properly for his own protection. This embarrassment is natural and is in fact common to all professional practice, but in view of the unpleasant conditions which may arise as a result of neglecting this important business phase, there can be no question but that an improvement of practice in this respect is in order.

There are various ways in which the architect may approach this subject. Some of them may prove awkward and irritating to the client, particularly if the various legal requirements are too greatly stressed. On the other hand, it is possible to present this matter gracefully and from the viewpoint of mutual protection so that no owner will hesitate to enter into the proposed agreements.

In general there seem to be three methods of meeting this situation:

1. Determining amount and time of payment by verbal agreement with the owner.
2. Establishing contractual relationship in letter form.
3. By the use of a properly executed contract between the architect and the owner.

Little comment is necessary as to the advisability of basing agreements between the owner and the architect solely upon verbal understandings. This relationship has no legal status and while it is very pleasant to do business on this basis, it is not fair to either party and constitutes a prolific source of disputation and litigation.

The establishment of a proper business understanding through the form of a letter from the architect to the owner and the acceptance of this letter by the owner seems to be the more graceful form of practice. About one-half of the architects with whom this question has been discussed use this method. As a matter of interest we present herewith a suggested form for such a letter:

"Dear Sir:

"We hereby offer our professional services as architects to prepare all the necessary plans, specifications and details required to enable a contractor to erect a residence upon your property at   and to superintend the erection. Naturally we will follow your desires and requirements in the preparation of these documents (and with the understanding that our estimate for the building shall not exceed $———).

"Our compensation for the above mentioned services will be —% of the completed cost of the work and, as is usual, partial payments will be due and payable as follows: Upon completion of the preliminary studies, one-fifth of the entire fee; upon completion of specifications and general working drawings sufficient for bidding or filing purposes, two-fifths of the entire fee; the remainder to be paid in equal monthly installments on the last day of each month during construction until fully paid, the amount of such installments to be determined by the estimated length of time which the work is to take. Until the actual completed cost is known all payments shall be based first, upon the original estimated cost of the work; second, upon the actual estimated cost when same is received and contractor accepted; and all partial payments made are on account of the entire fee as finally determined.

"Should this offer of professional services upon our part be acceptable to you, kindly sign your name upon the line under the word 'accepted' and return to us and oblige.

"Thanking you for this opportunity of serving you which we know will be mutually beneficial, we are,

" Respectfully yours,

ACCEPTED:

———————————"

It will be noted that this letter specifies the amount of payment and the time of payment and that without the use of legal forms an actual contract has been created. Another form is:

"Dear Sir:

"This letter constitutes an agreement between yourself and (architects' own name) by which we agree to furnish architects' services for your proposed (type and location of building).

"For full architects' services on this building our charge will be —% of the cost of the building, payable in accordance with the terms and conditions of the accompanying Schedule of Charges of the American Institute of Architects, with the following exceptions:

(Note here any exceptions which may be made by special agreement between the architect and owner.)

"If this agreement is acceptable to you, kindly sign and return a copy of this letter."

There has also been brought to our attention an unusually good method which is a compromise between the letter and contract methods of establishing the proper service agreement. In this instance, the architect has prepared a brief printed form of acceptance in which the commission is acknowledged and a statement is made as to the per cent to be charged for the executed work. A special clause is inserted under the heading, "Payment for Services," which gives the specific time of payments and per diem charges for the time of individuals of the architect's organization. A specific clause is also introduced stating that in case of abandonment or suspension of the work, a specific charge of —% is made for preliminary sketches, plans and specifications and an additional percentage where full sized details have been made. Appended to this printed agreement are several explanatory paragraphs of which the following are of particular interest as they bear upon points which often develop subjects for disagreement:

"Estimates of cost given the owner by the Architect are approximate only, and not guaranteed. Where actual bids exceed the estimate, the Architect will, without extra charge, revise the drawings and specifications to reduce the cost. Should the Owner suspend or abandon the project, the Architect is to be paid as outlined above for services rendered.

"Where the bids do not exceed the estimate and the Owner subsequently reduces his requirements, the Architect's charges shall be based on the plans and specifications prepared according to the Owner's original instructions and the revisions in plans and specifications will be charged for at cost.

"Where the Owner wishes changes in the plans and specifications after completion of the same, the Architect will make these at actual cost to him, of such revisions.

"Where the Owner furnishes part of the materials or labor entering into the construction of the building, or where old materials are used, the Architect will base his percentage upon estimated cost of equivalent new materials and the work if done by a responsible contractor.

"Superintendence: The Architect's supervision, as distinguished from the continuous personal superintendence of a Clerk of the Works, or a Superintendent of Construction, includes such general inspection of the work by the Architect or his deputy as is possible through periodical visits, the interpretation of drawings and specifications, general directing of the work, and keeping in touch with it sufficiently to enable him to issue the contractor's certificates for payment when due. On important work, for closer inspection and in order to insure systematic cooperation among the contractors and the most rapid progress, a Clerk of the Works under the direction of the Architect is to be employed by the Owner. In no event does the Architect assume responsibility for the work of the contractor or guarantee contractor's work."

In regard to the use of this printed form of agreement the architect makes the following comment:

"We ask the client in an accompanying letter to raise any questions that occur to him. Very few, however, are raised and altogether we find this method of apprising the owner more satisfactory than any form of contract, which latter he is always skeptical about signing, without the careful scrutiny of an Attorney."

Another architect has prepared a series of brief printed documents which constitute an outline of his professional practice and schedule of charges. A different document is used for each class of work done in the office. In these documents exact methods of determining amount and time of payments, together with other conditions affecting the agreement, are set forth. This document is not

signed but is of an explanatory nature and accompanies a brief letter accepting the commission, with the request for acknowledgment.

These letter forms of agreement offer a particularly valuable method of developing relationships on the types of architectural work which are more personal than commercial. In connection with residential work and certain forms of institutional work, it is highly desirable that the business phase of the understanding between the owner and architect be not unduly stressed. It is of equal importance, however, that more than a verbal arrangement shall be made, not only as a matter of legal protection but in order that the basis of remuneration shall be thoroughly understood. Here the architect must use his own discretion and there will undoubtedly arise instances where he prefers to make no attempt at establishing other than a verbal understanding. This is his own risk and while it may be good policy, it is not good business. There are many instances where dissatisfied clients have been created because of a lack of definite understanding during preliminary stages of the work as to the amount of the architect's fee and the time of payments. Experience has shown it to be far better that this matter is disposed of in one straightforward conference with the owner than to have it later the subject of a number of awkward and embarrassing discussions.

In connection with projects of larger size and perhaps a more commercial nature (particularly projects which are in stages of promotion and financing), it is quite important that the architect be protected through the form of a contract.

We learn from a number of architects who handle a large volume of work of this nature that it is their custom to have individual contracts drawn by attorneys and that in many instances the client insists upon a contract for service as drawn by his own attorney. Other architects have successfully employed standard forms of contracts which have been drawn up to meet the conditions of their own organization and business methods. The American Institute of Architects has developed standard forms of contract between the owner and the architect which may be obtained in quantity.

In order to demonstrate a typical brief contract form, we present herewith a contract which has been drawn up specially for the purposes of this article. This is the most simple form of contract which can be established and may be amended to suit the needs of the particular situation.

"AGREEMENT made this day of 1922 by and between owner and architect:

WITNESSETH—in consideration of the mutual covenants hereinafter set forth:—

1. The architect agrees to prepare all the necessary preliminary studies and other drawings and details necessary to enable a contractor to erect a building for the owner at site with an estimated but not guaranteed cost of $———— and to superintend the erection and to perform all other usual architectural work necessary for the erection and completion of the building in question.

2. The owner agrees to employ the architect for the hereinbefore specified professional services set forth in the first paragraph and to pay him therefor the sum of————% upon the total cost of the completed work, and further agrees to make partial payments as follows: Upon completion of the preliminary studies, one-fifth of the entire fee; upon completion of specifications and general working drawings sufficient for bidding or filing purposes, two-fifths of the entire fee; the remainder to be paid in equal monthly installments on the last day of each month during construction until fully paid, the amount of such installments to be determined by the estimated length of time which the work is to take. Until the actual completed cost is known all payments shall be based first, upon the original estimated cost of the work; second, upon the actual estimated cost when same is received and contractor accepted; and all partial payments made are on account of the entire fee as finally determined.

3. Drawings, details and specifications as instruments of service are agreed to be the property of the architect.

IN WITNESS WHEREOF the parties hereto have set their hands and seals the day and year hereinbefore set forth.

————————————

————————————"

The best possible advice that we can extend to every architect is that he will find it greatly to his advantage to retain legal service regularly. This does not constitute a great expense and is really a form of insurance which will serve not only to prevent direct financial loss but in many instances will guarantee better client relationships because of the consequent avoidance of those points of disagreement which may arise unexpectedly and without any knowing breach of good faith.

The services of an attorney from the architect's viewpoint are of value not only in establishing proper client relationships but in connection with the letting of contracts and sub-contracts and other business responsibilities which develop in connection with architectural practice. We can cite many instances where the architect, as agent for the owner, has made serious business blunders which would have been avoided through good legal advice. Perhaps one-half of the misunderstandings which arise between the architect and the owner would be eliminated if the advice of a good lawyer had been asked and *followed* at times when agreements involving financial liability were being made.

In regard to the direct contractual relationship with the client, there are certain points which we have already indicated as of particular importance. In order to show methods which have been successfully employed to meet these conditions, we have selected specific clauses at random from a number of good contract forms. Several of these will be quoted in later paragraphs.

One of the most common sources of misunderstanding and dispute between the owner and the architect is to be found in the subject of the estimated cost of a proposed building. Ordinarily, the client sets some approximate cost limit as the amount which he is willing to expend for a new building. It is the objective of the architect, therefore, to design a building which will come within this cost. Many architects do not realize that by

legal requirements, unless otherwise specified, the building must come within or reasonably near to the proposed cost, if the architect is to be legally entitled to collect any fee whatsoever.

William Law Bowman has clearly defined this situation in articles presented through THE ARCHITECTURAL FORUM several years ago. We quote from one of these articles as follows:

"Probably the most usual and popular condition attached to an architect's employment is the condition that he shall give his employer a building which shall cost within a certain fixed sum. On account of the fact that the architect's remuneration is some percentage of the actual cost of construction, the general public immediately assume that which sometimes is a fact, that the architect tries to make a building cost as much as possible to increase his compensation. The law as regards employment by others than municipal or governmental bodies is well settled, that where the owner stipulates that the plans and specifications shall be for a building not to cost over a specified amount, the architect must draw the plans and specifications for a building to cost reasonably near that amount, otherwise he fails to live up to his contract and cannot recover for his services. For example, (1) it has been held that an employment to prepare plans for a house to cost $100,000 where the contractor's estimate, including architect's fee and superintendence, was $107,500, and also (2) in another case where the plans were to be within $50,000 and the estimate was $52,500, and in (3) a further case where the plans were not to exceed $2,500 and the estimate was $3,100, that in each case there was a substantial performance and the architect could recover his compensation for such plans and specifications. The following are cases where recovery was not permitted, namely, (a) where the contract called for a building to cost $4,300 and the lowest bid was $7,000; (b) where the cost was to be $18,000 and the lowest contract offer was $35,000; and (c) where the cost was not to exceed $4,500 and the estimate was $8,000."

Certainly, as an architect is rendering professional service it is not fair to ask him to guarantee prices, but where the owner has set a cost limit there is a very serious legal question involved if the architect, in designing the building, does not bring the cost reasonably near to the limit set, or if he has not some definite form of release from this condition. A typical form of such release is:

"It is understood that the Architect is not a contractor and therefore cannot guarantee the cost of the work and that his services are strictly professional, being confined entirely to an expression of opinion as to cost of the work based on past experience."

Other important points include the method of determining the amount of payment for service and the times at which the various amounts which make up this fee are due and payable. Following are quotations from various contract forms and letters:

"For the compensation of——————per centum of the total cost we propose to at once proceed to furnish the preliminary studies, and afterward general, complete and sufficient drawings, specifications and details, satisfactory to you, and furnish general superintendence of the building operations in connection with the erection of——————for said—————— on the property on——————set aside for that purpose.

Upon the following terms of payment, TO WIT:

Of the total compensation above named there shall be paid

TWO-TENTHS (2/10) when the preliminary studies shall have been made; and

THREE-TENTHS (3/10) additional when the general drawings and specifications shall have been made; and

TWO-TENTHS (2/10) additional when details shall have been made and the plans ready for the letting of contracts; and

The remainder from time to time after construction shall have begun in proportionate amounts as work shall have been accomplished. The amount of our compensation is to be calculated upon the total cost of the building, including stationary and detachable fixtures. No rebate will be made from this amount on account of any material or labor purchased or contracts made by you individually."

Following is another method:

"Our fees for the above services will be six (6%) per cent of the entire cost of the building (determined from the contract prices), including the survey, borings if required, fixed or detached furnishings designed or installed under our superintendence, mechanical, electrical, sanitary and other equipment for which we supply drawings, specifications or superintendence.

"When the working drawings and specifications have been prepared, the sum of three (3%) per cent of the estimated cost of the building shall be paid to us on account of services rendered, provided, however, that if the preparation of plans extends over a period of more than two months, payments on account shall be made to us from time to time, such payment to be approximately proportioned to the progress of work on the plans. After contracts are let payments of three (3%) per cent of the amount of the certificates issued to the contractor or contractors shall be made at the respective times such certificates are issued, and the remainder of the six (6%), if there be any, at the issuance of the final certificate; it being understood that the total of our fees shall be six (6%) per cent of the total final cost, as above stated."

Another method of dividing payments on the percentage fee basis is:

"The Owner shall make payments to the Architect upon account of and in final settlement of his fee at successive stages of the work as follows:

(a) For the Preliminary Drawings, one and one-fifth per cent ($1\frac{1}{5}\%$) of the estimated cost of the work. The estimated cost of the building as contemplated in the Preliminary Drawings shall as a basis for this portion of Architect's fee be temporarily established at $——————.

(b) Upon the execution of any contract for work upon the building, two and two-fifths per cent ($2\frac{2}{5}\%$) of the contract price; but if the letting of the contract or contracts for the said work be delayed through no fault of the Architect for sixty (60) calendar days after the completion of the working drawings and specifications, then this percentage shall be paid to the Architect upon the lowest bid for said work; and in the absence of such bid then upon an accurate estimate of the cost of said work based upon the then prevailing market price.

(c) Upon the amount of each certificate for payment under any contract for work upon the building, duly certified by the Architect, plus the retained percentage, two and two-fifths per cent ($2\frac{2}{5}\%$).

(d) Upon the completion of the work and the fulfillment of the requirements, the Owner will pay the Architect any balance remaining due hereunder, all previous payments being considered as payments on account."

Following is a special provision for the amount and method of payment where the fee is on a cost plus basis:

"(a) The Owner agrees to pay the Architect for the performance of the above services the net cost to him of his own time and that of his assistants and employes, plus a fee equal to——————per cent (——%) of such cost, which fee shall include all other costs, overhead and profit, it being understood and agreed that the total sum above specified for cost and fee shall not exceed——————per cent (——%) of the total construction cost of the work for which services are performed.

"(b) Whether the work is executed or whether its execution be suspended or abandoned in part or in whole, payments to the Architect are to be made monthly, covering the services performed, in accordance with statements rendered by the Architect on or about the tenth day of each month, which statements shall include the cost of work done during the preceding month plus a proportionate amount of the fee—it being agreed, however, that at the time of completion of drawings, specifications and scale details, ready for awarding contracts, the total payments to the architect shall not exceed ——————per cent (——%) of the reasonable estimated cost, and, should the total cost plus fee exceed the maximum amount as herein stipulated, all such excess shall be borne by the Architect."

Study of Construction in Architectural Education

By CHARLES W. KILLAM

THE editor has asked me to comment upon the report on the teaching of construction in the Ecole des Beaux-Arts presented by Professor Edouard Arnaud to the Franco-British Association of Architects and published in the *Journal of the Royal Institute of British Architects* of January 14, 1922; also to discuss any points of interest to a Professor of Architectural Construction in the paper by Thomas E. Collcutt, Past President R. I. B. A., entitled "A Plea for a Broader Conception of Architectural Education," published in the same number of the *Journal*.

Professor Arnaud describes his method, adopted last year, for teaching practical building methods in the Ecole. His course presupposes a knowledge of the materials of construction and the methods of joining wood, iron and stone. He exhibits some six or seven thousand lantern slides illustrating the construction of buildings from excavation to decoration. The students are not expected to take notes in the lectures, as they are supplied with a set of notes giving the complete text and all the illustrations, but they are required to submit note-book sketches, made between lectures. They are given, in particular, a set of 90 questions which will be asked at the examination, these questions covering the fundamental operations. They are required to produce a final constructional design demanding two and a half months of "assiduous" work. This work is in addition to the mathematical analysis of the theory of construction taught in other courses, and is likely to give pause to the enthusiastic young American who hopes to go to the Ecole to get rid of mathematics and construction and to concentrate on design. The large number of lantern slides makes the course sound hurried. Schools in this country use some slides, photographic enlargements, blackboard sketches and working drawings, and conduct trips to buildings and works, and are now considering the use of moving pictures to illustrate methods of preparing and putting together building materials.

The same number of the *Journal* has a report of the paper by Mr. Collcutt on "A Plea for a Broader Conception of Architectural Education," with discussion thereof by several members. Mr. Collcutt is critical of architectural education in England. He presents these constructive suggestions—to weed out students adjudged unfitted to the profession after a probationary period; to reduce the number of problems dealing with large buildings; for students to omit some studies (not named) but to study Greek literature, to visit the Acropolis, and to study Doric flutings. The paper was long and discursive, but it brought forth discussion which may be worth considering. He suggests, in the first place, that no student should be finally accepted in an architectural school unless he can show, after two years' probation, that he has a peculiar native aptitude or tendency to architecture above any other calling. Mr. Collcutt probably uses "architecture" in the same narrow way that some graduates of the Ecole do; that is, as including only design in its narrow sense, although—like many critics of architectural education—he does not define. Architecture differs from painting, sculpture, poetry or the drama in that it is not a purely personal creative art, all the work of which must be carried out by the individual artist. It is a many sided profession and it has room in it for the artist, the planner, the draftsman, the colorist, the decorator, the constructor and the business man. A student should not be kept out of the profession because, at 18, he appears to lack one or more of these gifts.

Mr. Collcutt would have the students' aptitude ascertained by a body of examiners independent of the schools. Instructors in architectural schools know far more than outsiders about the personality of the students, which will be so important in their future careers, and they know that personality cannot be judged by a written examination or by a competition in design. They know very well, moreover, that no school record is a sufficient basis for a decision as to whether a boy of 18 or 20 is fitted to be an architect. Their knowledge of the later lives of their graduates makes them hesitate to claim omniscience or the gift of prophecy. Not all successful architects were geniuses at 18.

Mr. Collcutt specifies that the examination to determine the student's aptitude should be confined to architecture and that "steel beams and perspective coloring" should not be considered. He complains that architecture as a fine art seems to be a secondary consideration in the schools, and is much troubled because the schools teach the design of "steel beams," and at the same time he complains of a graduate who entered his office and displayed no "practical" knowledge. He does not define "practical" and he does not tell what he expects from the schools, but he does make it clear that he does not want the student to know about "steel beams" or "perspective coloring" or "geometrical drawing." One can only guess that he wants the student to be familiar with the details of construction, with brickwork, joinery, window frames and roof covering, for instance; that he wants him to be familiar with the trades rather than with the sciences. Every professor of construction knows how easy it would be to teach these more or less ephemeral and ever-varying details, and how the students think they are getting something valuable when they note down a lot of detailed dimensions, or detail a window frame, or draw a thousand rivet heads on a plate girder; but the professor also knows that the schools have no

business to waste their time on such details. Mr. Collcutt thinks that because an architect with considerable practice is not likely to design his own steel beams, therefore a student should not waste time learning the method. There are probably ten small offices, where the architect must himself do or know all about every part of the work, to one large office, where specialists can be hired; and architectural schools must not train assistants for large offices only. Mr. Collcutt is over-troubled by the problem of the design of a steel beam. It is not an insuperable problem for the kind of mentality needed to be a successful practitioner, although it may trouble the long-haired designer who is fit only to be kept cooped up in an office without knowledge or interest in the ways in which his ideas must be executed. Mr. Collcutt does not appreciate the value of the by-products in the teaching of architectural construction. The theory of construction, properly taught, fits the student not only to actually design the relatively simple structural work of the great majority of ordinary buildings, to consult intelligently with engineers, to supervise construction with judgment and authority, but to do his "architecture" more reasonably because he will have some idea of how a building is put together. He will also gain a qualitative sense of construction, even if he never actually performs a computation.

The teaching of design and drawing develops only one side of the student's nature—the most important side, it is true, but not the only side. An architect is not a mere painter whose finished work is an idea transferred to canvas by his own hand. An architect's idea is useful only when built by the help of many men and of many sciences and trades; he must conform to countless conditions of locations and laws, and use many methods and materials. It takes a many-sided man or organization to weld all of these elements together into a successful building. The student must therefore be grounded in fundamental principles and habits applicable to the many sides of his future work, and the teaching of construction helps.

The study of building construction demands continual use of the imagination in visualizing the problem, and continual use of judgment in evaluating the elements which affect it. The young student is a very inexperienced person. It is difficult for him to visualize in three dimensions; in fact it is difficult for him to visualize at all at first. A constructor cannot limit himself to two dimensions; he must think in three dimensions; the design of a beam, the collection of loads on a column or truss, the design of a reinforced column footing, are impossible without thinking in three dimensions. Many problems in computation of stresses require either diagrams to make the problem clear or the ability to visualize the problem without the diagrams. This latter ability is valuable because it can be applied to so many other problems of the profession. By occasionally working out the structure of one of his problems in design, the student gains far more than the ability to design a beam—he gains a sense of the real forms that he is dealing with. To the experienced architect it is second nature to bear in mind the important structural elements when he is planning, but it is not second nature to the young student. When a student is required to frame the floors and roof of his design he begins to appreciate from his own observation that the second floor plan has something to do with the first, that the side elevation is related to the front, that both cross-sections of a large room are of interest, and that the roof ought to fit on top. It takes the whole staff of a school to start him in appreciating these things, and the professor of construction helps.

Students can be taught to overcome the fear of simple mathematics, of which some of them are proud because they think it proves them better designers. The professor of construction can call the student's attention to reasonable requirements as to precision, when to bother about three places of decimals, and when to approximate; when to subordinate unimportant factors and to look out for the important ones. He can thus learn to concentrate on essentials and that is a valuable ability in all of the work of the profession. Most designers think that construction is an exact science and that mathematics will give the right result. The student can be taught that many parts of construction cannot be reduced to an exact science, that much depends upon intelligent assumptions based on judgment, experience with work as actually put together by fallible men with imperfect materials and subject to all the attacks of the elements. This necessity for considering these apparently outside elements in his construction problems may lead him to wider observation of the elements which will affect his planning and design problems.

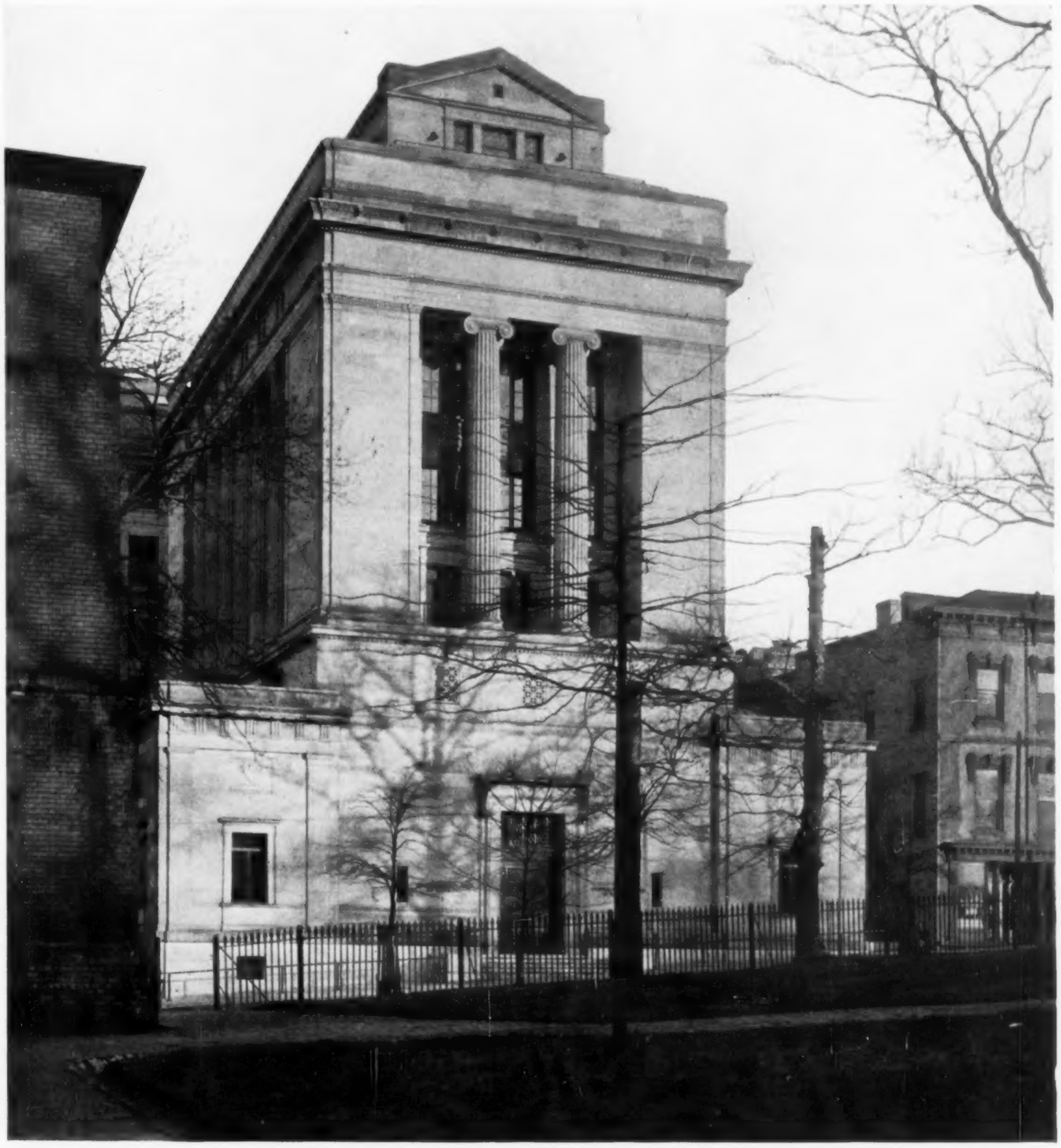
It is a part of the work of the professor of construction to inculcate some of the habits of mind which will help an architect to attack the many different kinds of problems which he must solve, to teach the habit of reasoning from cause to effect, to suggest habits of neat and orderly presentation of ideas by drawings, oral statement, written words or numeric work. Questions in examinations can be so arranged and the answers so criticized that students will learn the value of an orderly statement and the value of the ability to express themselves in clear English. Not all building laws or specifications are perfect in these respects. Many of these principles and habits are emphasized very little in the ordinary criticism in a design course, but as long as architecture is an art, a profession, a science and a business, they are invaluable principles and habits.

The Federal Reserve Bank of Richmond

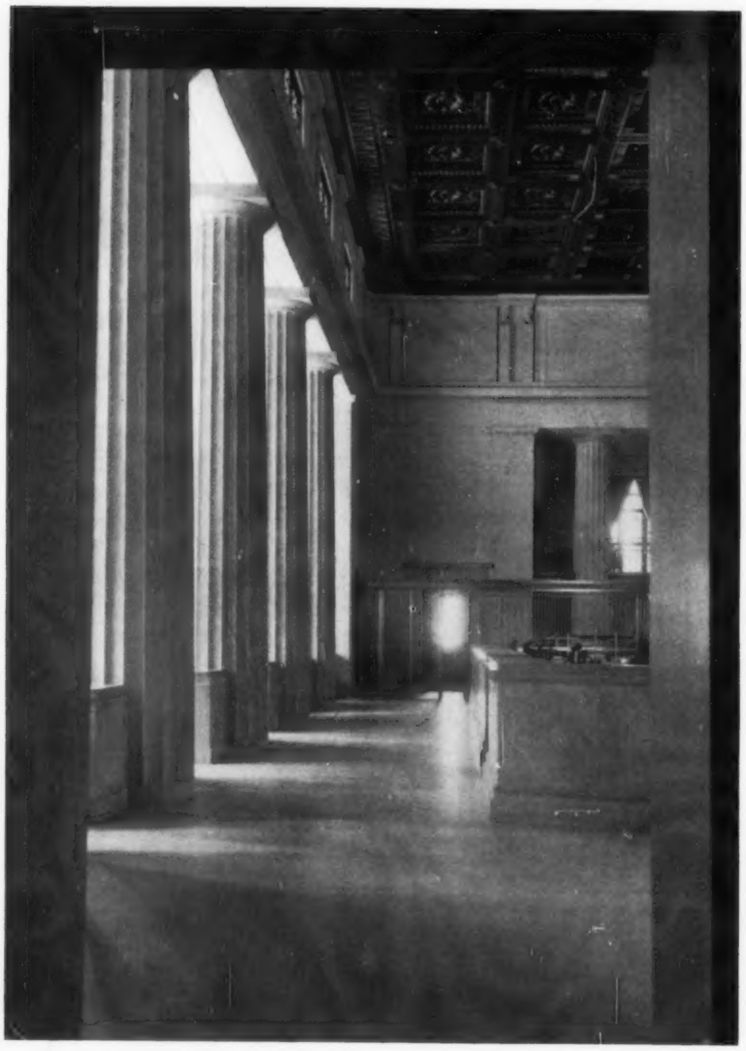
SILL, BUCKLER & FENHAGEN, ARCHITECTS

THE Federal Reserve Banks constitute the most important building activity of architectural character undertaken by the Government in several years. The commissions have been placed in the hands of private architects, selected either by competition or direct appointment because of previous experience with bank planning. A consulting architect, or in the case of competitions a professional adviser, was named who devoted detailed study to the special problem of the Reserve Bank before any actual work was undertaken, proving a valuable link between the Federal Reserve Board and the architects. These are ideal conditions for the design and construction of Federal buildings and it is hoped the results will merit their general adoption for government work.

The Federal Reserve Bank of Richmond was one of the first buildings to be completed. The design was selected early in 1917 from eight designs submitted in competition by as many architectural firms, the Jury of Award consisting of three members of the Building Committee in addition to Burt L. Fenner of New York and Thomas J. D. Fuller of Washington. Their second choice was the design submitted by Carneal & Johnston of Richmond, and the third that of Parker, Thomas & Rice of



General View of Principal Facade



Main Banking Room Seen from Elevator Lobby

Baltimore and Boston. The entry of the United States into the world war prevented the beginning of operations until June, 1919.

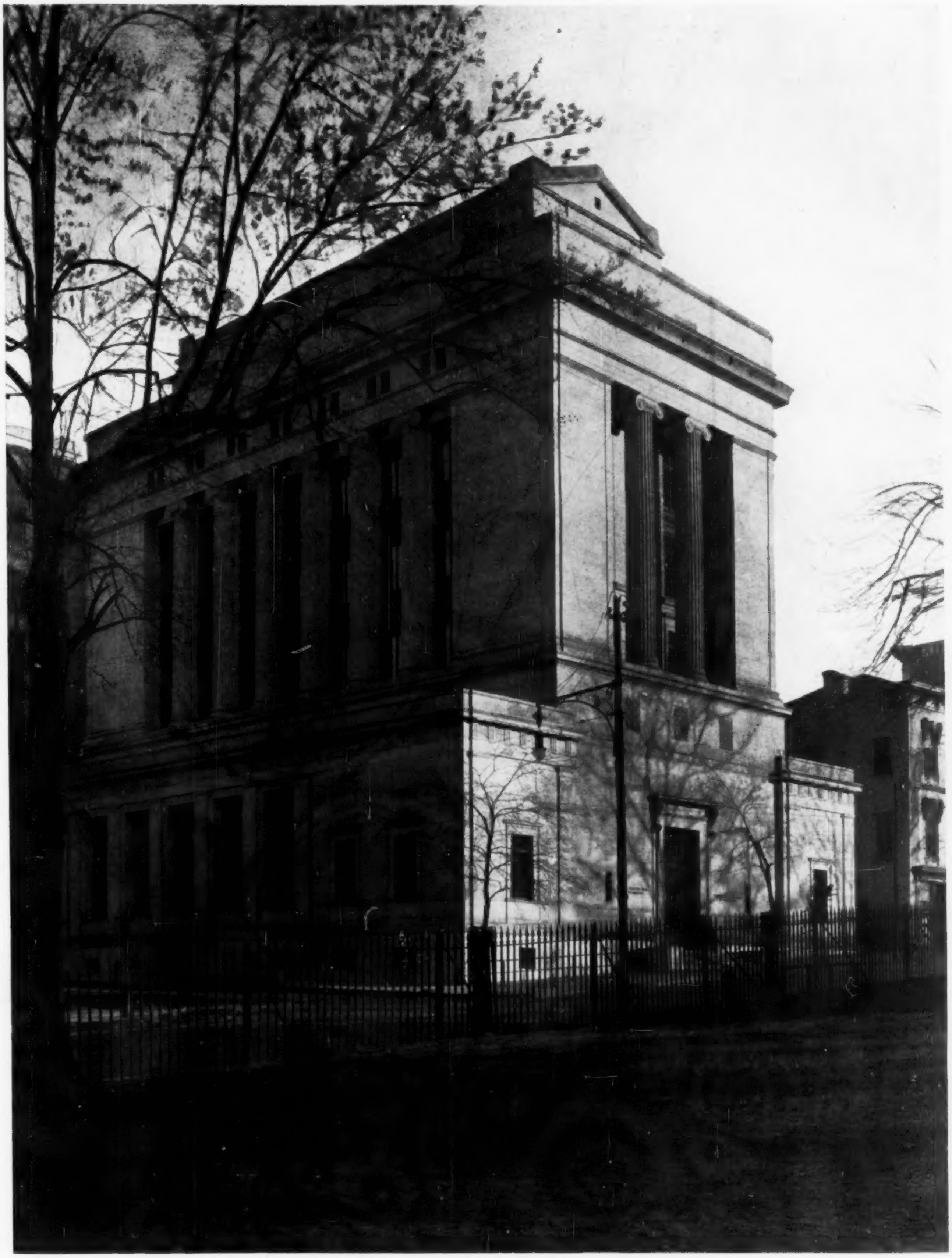
The exterior of the structure is a direct expression of the plan from which it was developed—a free adaptation of Greek precedent, more suggestive possibly of the great mausoleum at Helicarnassus than of any other single structure. In general it recalls this structure in the placing of its colonnade of massive Ionic columns above a high and simple base. It was thought desirable that no portion of the space given up to offices should be more than 25 feet from direct light; this meant that unless areas of working space were to be broken by light courts it was imperative that the upper part of the structure should not exceed 50 feet in width. The main banking room on the ground floor occupies all the space which the building plot made available, but the demands of light requirement were maintained by the introduction of clerestory windows for the central space and additional windows for the projecting side aisles.

A granite plinth of decreasing height on the main facade, topped by a broad band of carved ornament, offsets the slope of the site and forms a base. Upon this foundation is placed the building proper, the lower story of which extends across the full width of the property, above which and smaller in area rise the upper stories, surrounded by the Ionic colonnade which in turn supports the massive entablature and cornice. This simple, dignified structure is of Indiana limestone in a pleasant and uniform color of grayish buff.

Since the functions of a Federal Reserve Bank differ considerably from those of the usual bank, involving relations with other banks and not with individual depositors, the arrangement of its quarters differs accordingly. As one enters the banking room the absence of the customary screen and partitioned offices on the banking floor is immediately noticed, and the visitor is impressed with the sense of openness and ample space. Offices of the bank's officials and their assistants are placed back of the columns, separated by low marble rails, and in the "island" at the center of the room. Many new practical methods of handling routine work have been originated for this bank and its equipment includes every improvement known to bank designers. Fireproof safes have been installed under desks throughout the different departments, thus eliminating the necessity and loss of time in transporting records.

In the Money Department, money counters have been provided with specially designed desks with open-work metal tops, where all the money being counted is in plain view at all times, and it may be locked so when the counter is absent. All money while in transit from one department to another is transported in locked steel buses. To facilitate the quick dispatch of papers, records, etc., from one department to another on different floors, pneumatic tubes have been installed. An arrangement has been provided by which the front door of the building can be instantly locked.

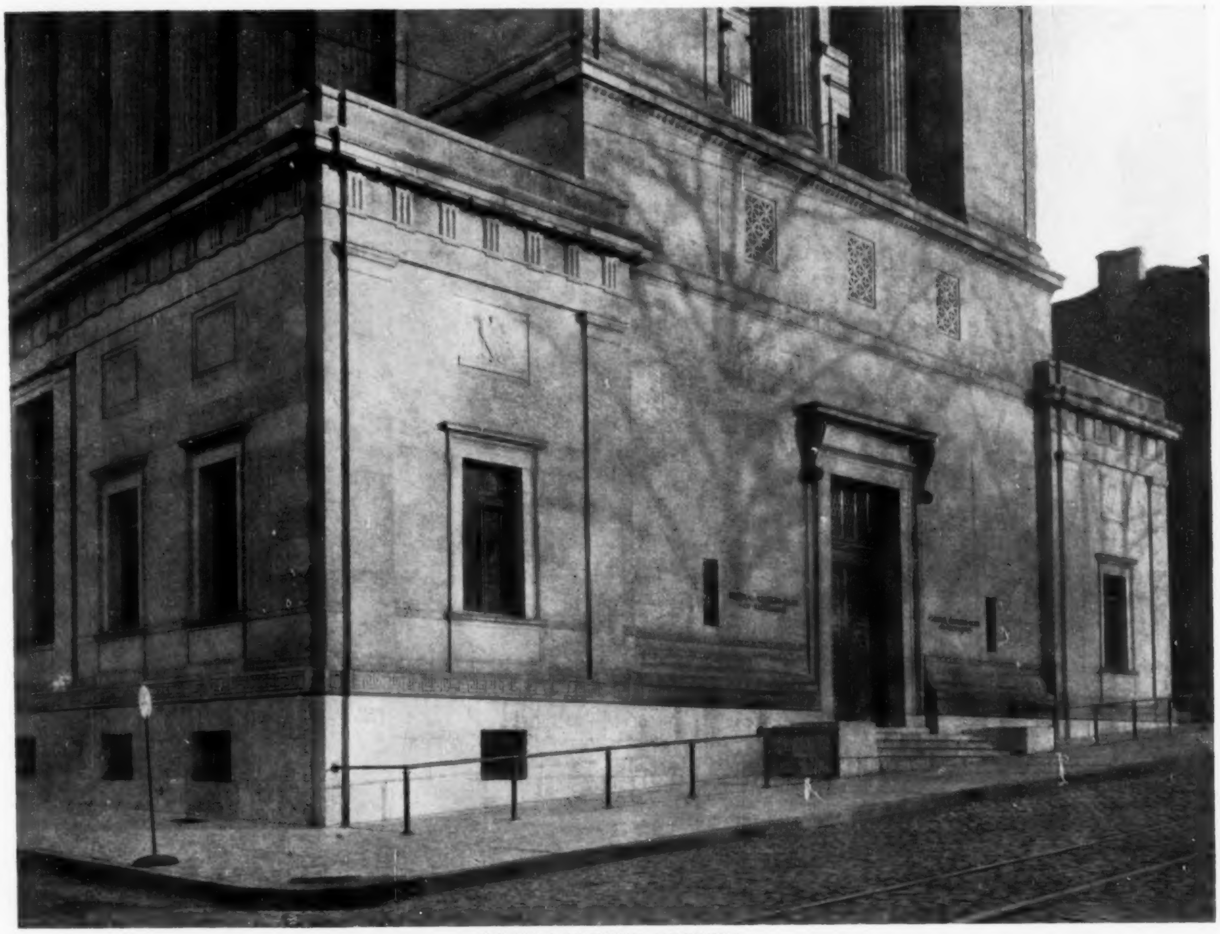
The vaults were designed to be proof against attack by the most skilled burglars or by mob violence. The vault is three stories high, and the lowest story is 52 feet long by 26 feet wide. The upper floor is on a level with the basement floor of the building, and the bottom floor extends a considerable depth below the sub-basement. They are connected by a stairway and automatic lift. In all working quarters special care has been taken to reduce noise by the use of cork tile flooring and a sound absorbing tile for the ceilings.



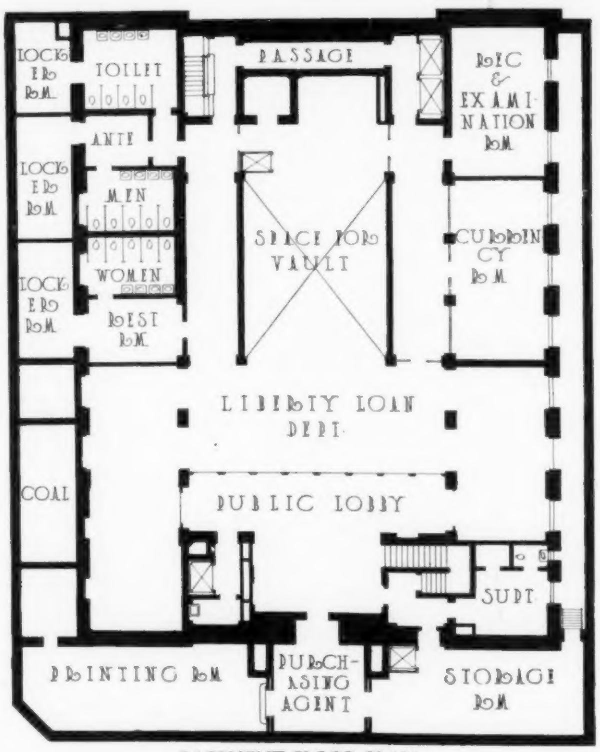
GENERAL VIEW

FEDERAL RESERVE BANK, RICHMOND, VA.

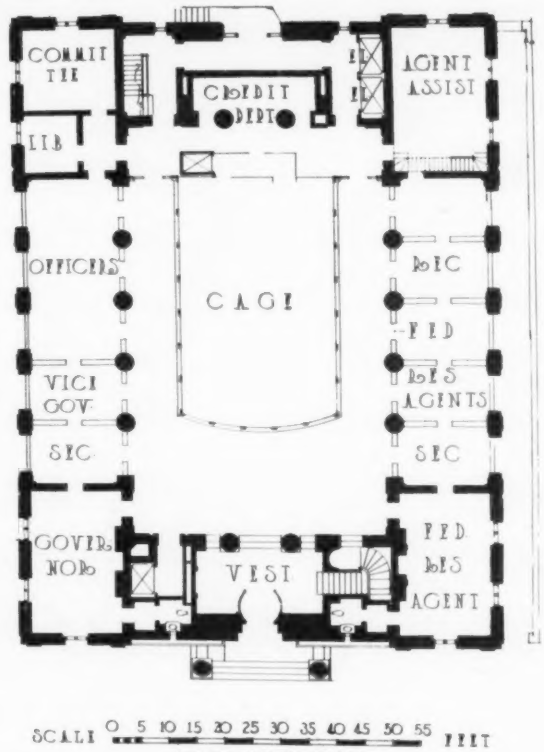
SILL, BUCKLER & FENHAGEN, ARCHITECTS



VIEW OF LOWER STORIES



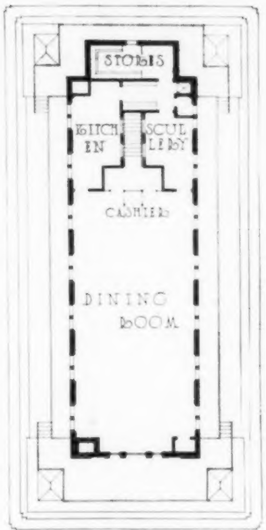
BASEMENT FLOOR PLAN



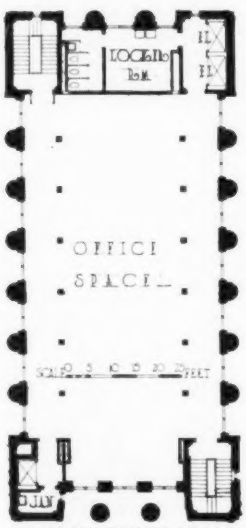
FIRST FLOOR PLAN

FEDERAL RESERVE BANK, RICHMOND, VA.

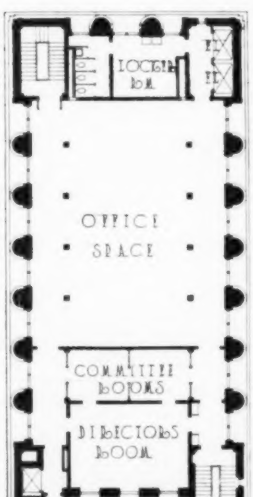
SILL, BUCKLER & FENHAGEN, ARCHITECTS



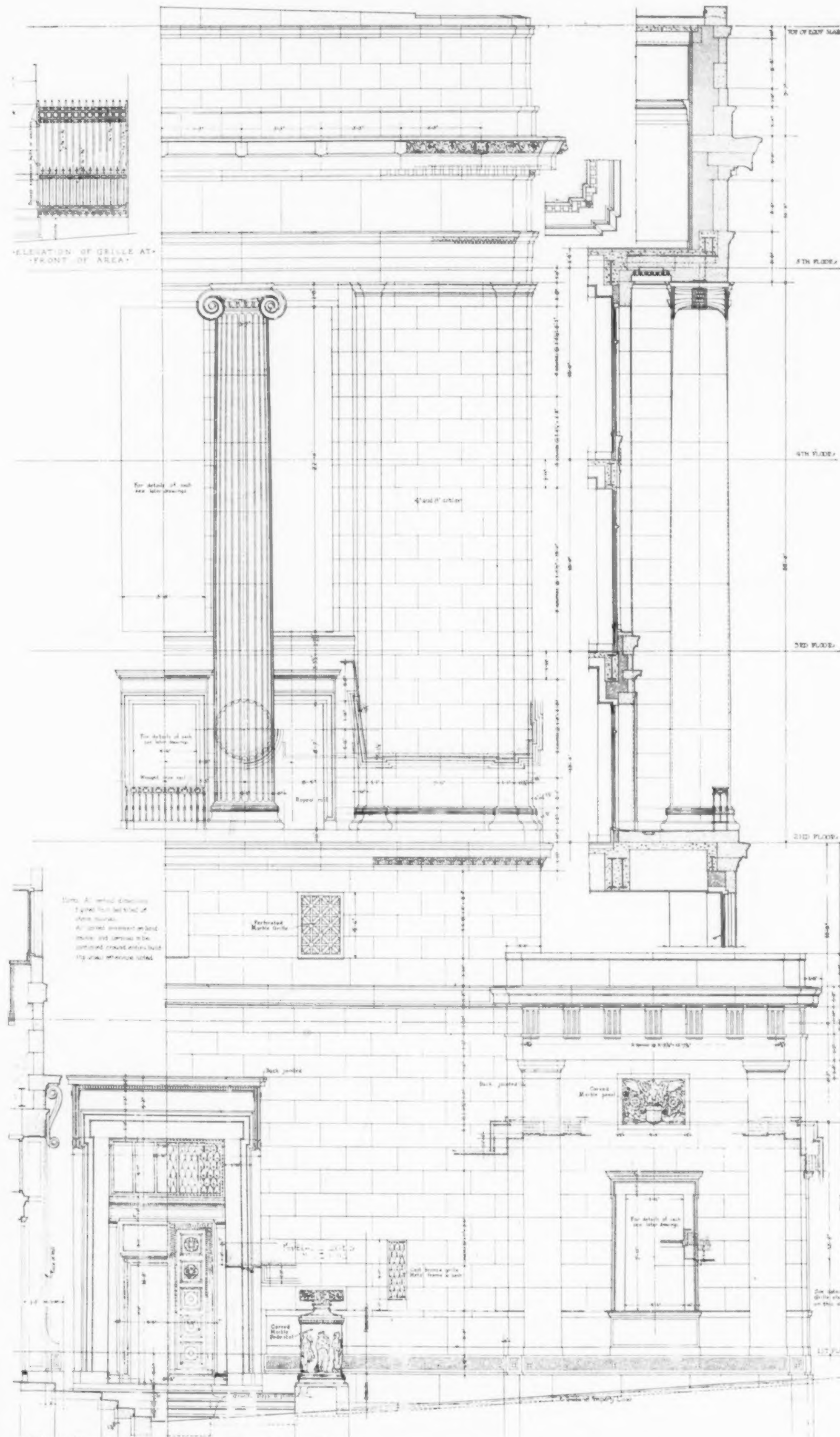
SIXTH FLOOR PLAN



TYPICAL FLOOR PLAN



SECOND FLOOR PLAN

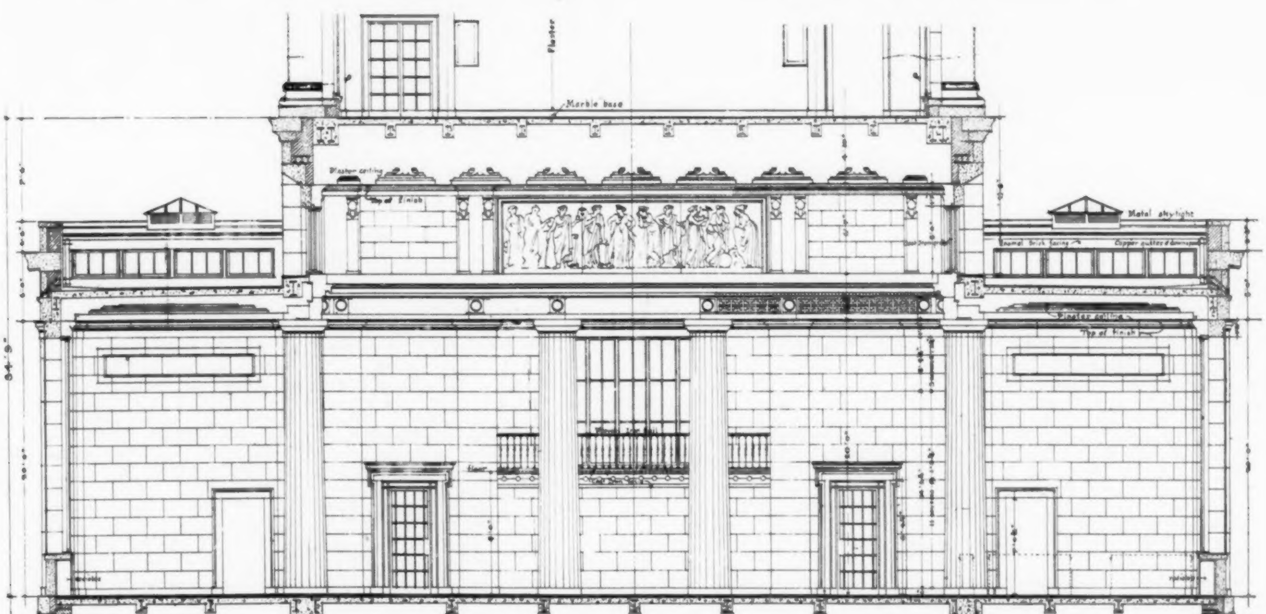


DETAIL OF MAIN FACADE

FEDERAL RESERVE BANK, RICHMOND, VA.

SILL, BUCKLER & FENHAGEN, ARCHITECTS

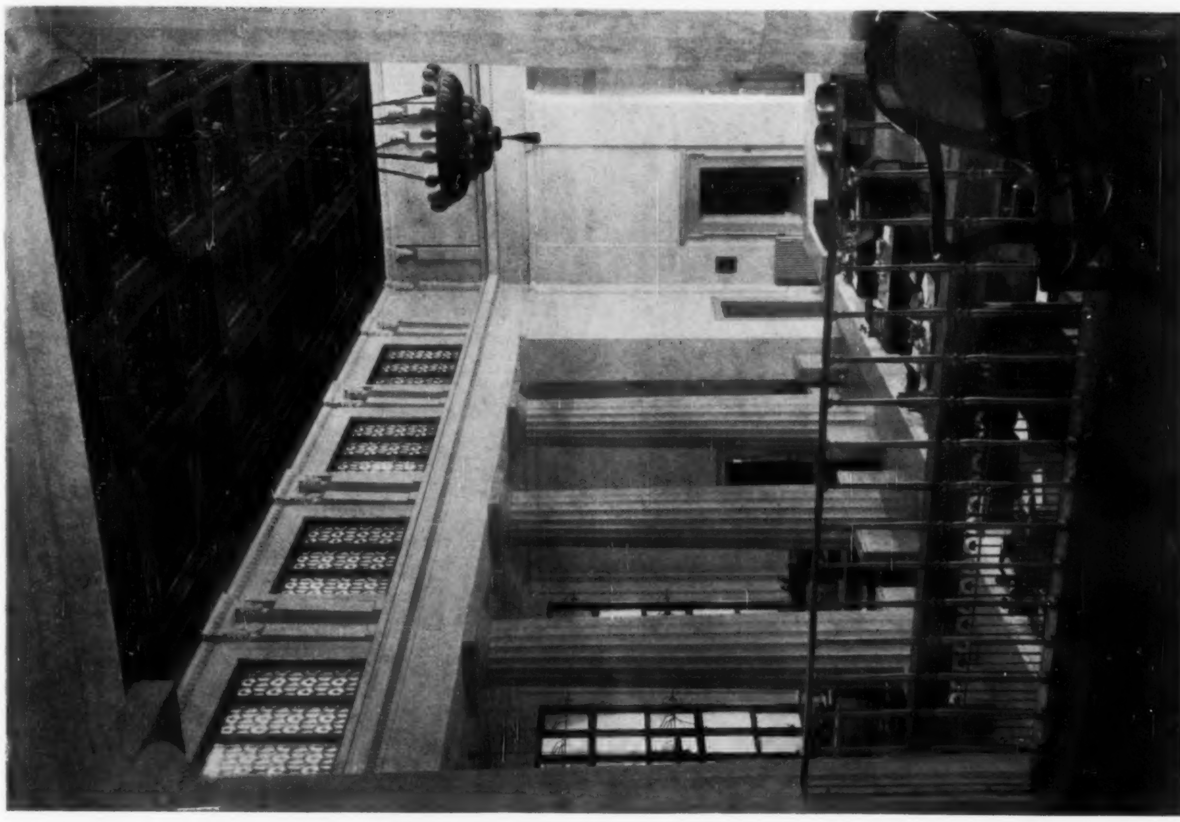
MAIN BANKING ROOM FROM THE FRONT

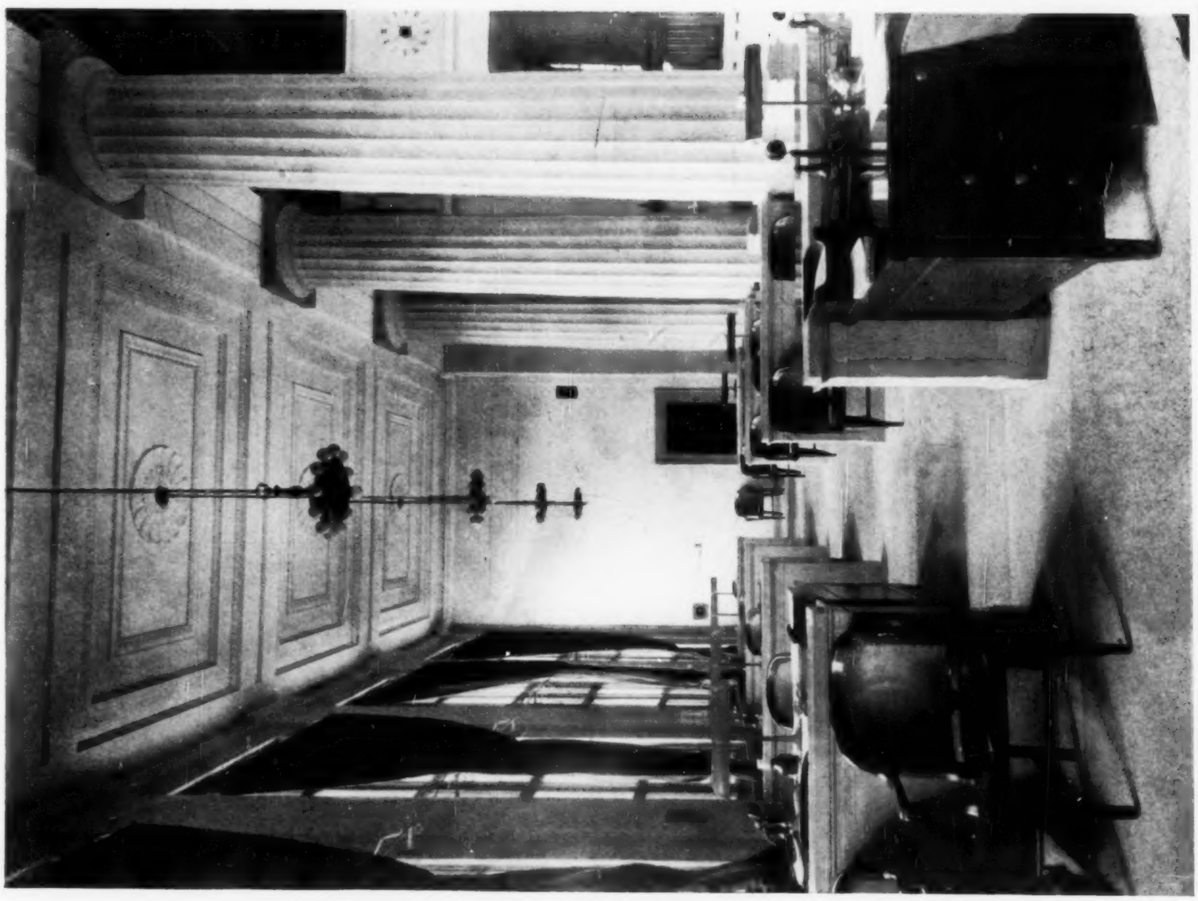


TRANSVERSE SECTION THROUGH MAIN FLOOR

FEDERAL RESERVE BANK, RICHMOND, VA.

SILL, BUCKLER & FENHAGEN, ARCHITECTS

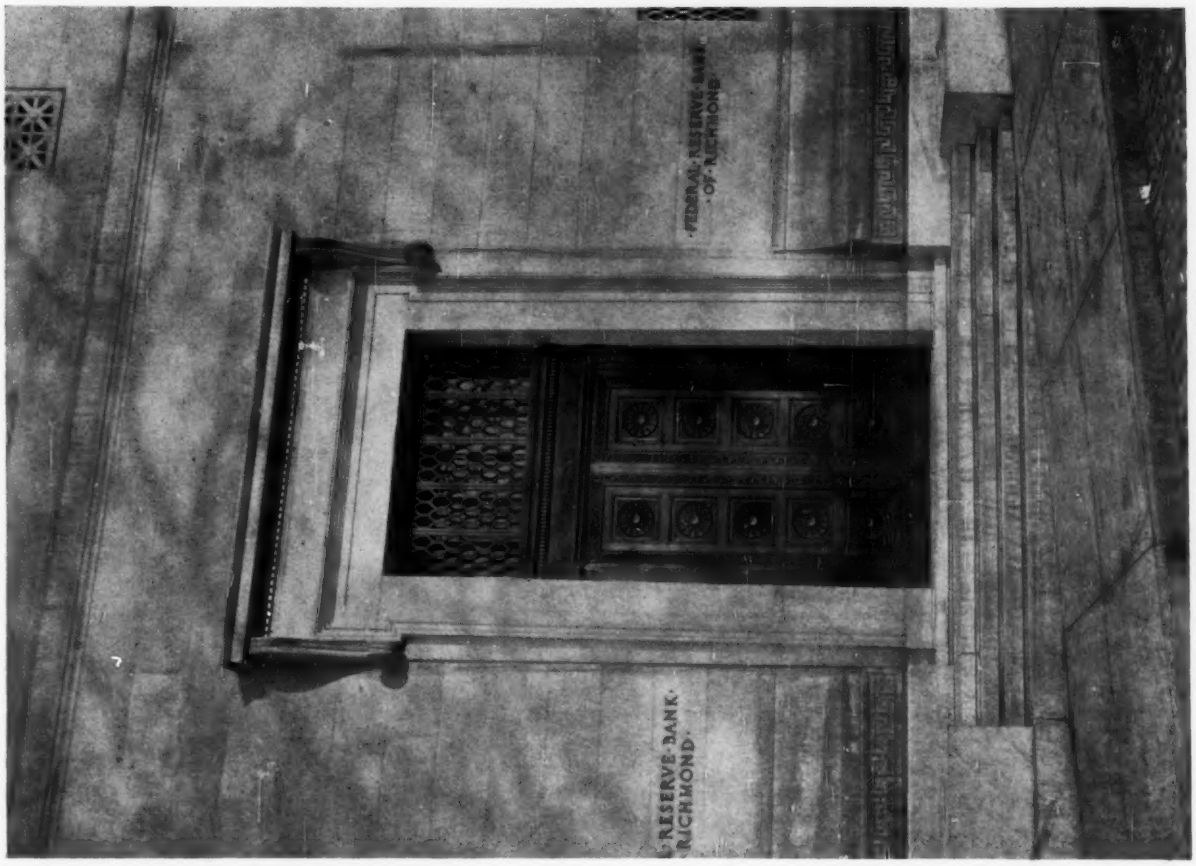




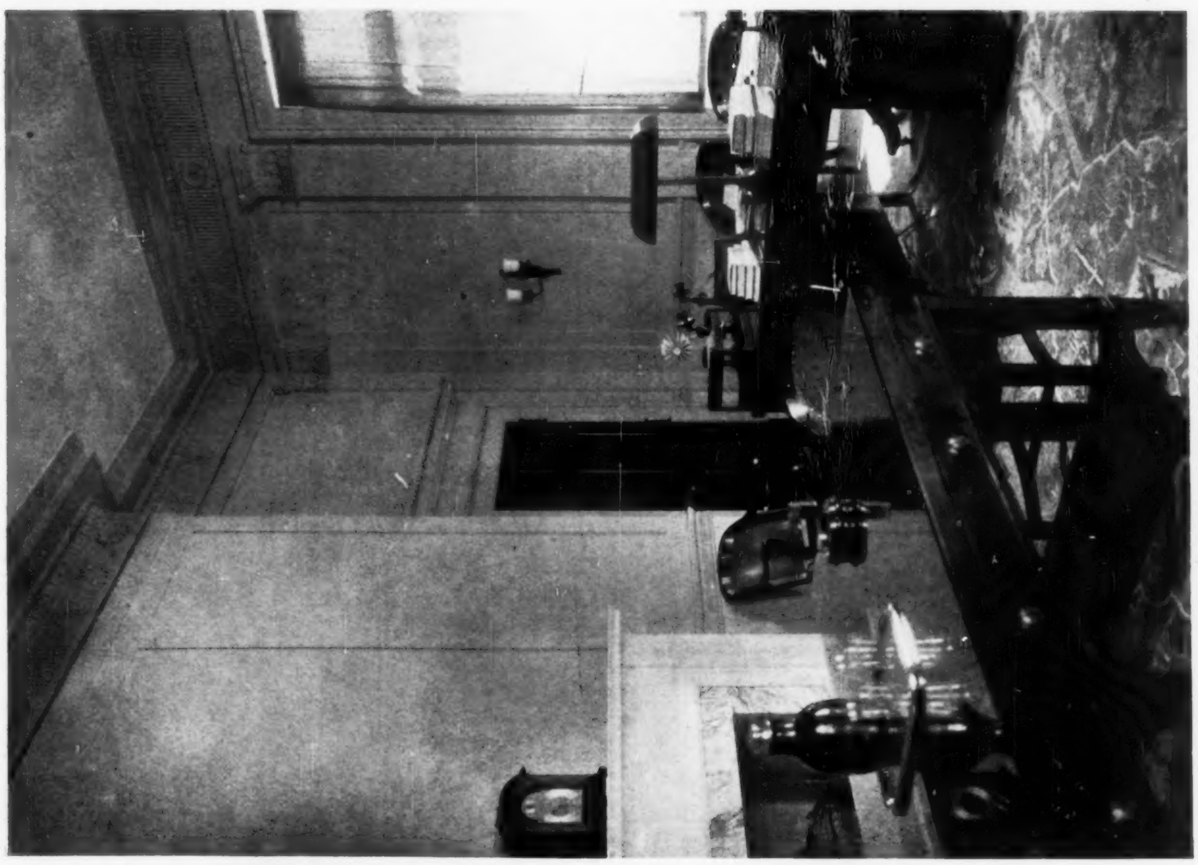
OFFICERS' SPACE AND BANKING ROOM FROM MEZZANINE

FEDERAL RESERVE BANK, RICHMOND, VA.

SILL, BUCKLER & FENHAGEN, ARCHITECTS



MAIN ENTRANCE DOORWAY



GOVERNOR'S ROOM

FEDERAL RESERVE BANK, RICHMOND, VA.

SILL, BUCKLER & FENHAGEN, ARCHITECTS

Concrete Construction

I. HISTORY AND USES

By WALTER W. CLIFFORD, *of Clifford & Roeblad, Engineers*

SOME years before Cato's sinister aphorism concerning Carthage had been carried out, the Carthagenians built a 70-mile aqueduct with hydraulic cement. This construction included many arches, some of which are still standing and are perhaps the oldest existing structures of concrete, although there are evidences of the use of hydraulic cement by the Egyptians nearly 2000 years earlier.

The Romans used concrete to a considerable extent. The dome of the Pantheon with its diameter of 142 feet is one of the best known examples of their work. These early hydraulic cements were of course compounded by nature, unaided by well equipped laboratories. After Rome's glory had become history, the use of cement and concrete ceased for many years. In 1756 one John Smeaton rediscovered the hydraulic properties of argillaceous limestone, and his cement was used in the construction of the Eddystone lighthouse. Natural cement was manufactured in England and France from the beginning of the nineteenth century. In the United States it was first manufactured by Canvass White near Fayetteville, N. Y., in 1818, and was used in building the Erie Canal.

Portland cement was patented in England in 1824 by Joseph Aspden, a brick mason of Leeds. The name is taken from the island of Portland because of a real or fancied resemblance of the limestone there quarried to concrete made from the new cement. England was the first leader in the production of Portland cement; Germany then took the lead which was later wrested from her by the United States. The first Portland cement to be manufactured in the United States was made by David O. Saylor of Copley, Pa., in 1871. Just before the world war the United States' production of Portland cement was 93 million barrels, Germany's 42 million and Great Britain's about 17 million. Cement manufacture fell off in all countries during the war, but the United States is practically back to prewar production and its relative standing is probably about the same as before the war.

All these early examples of concrete work are without reinforcement. To Joseph Monier is ordinarily given credit for the invention of reinforced concrete. He was a gardener and, being anxious to cut down the thickness and weight of his ornamental flower pots, conceived the idea of introducing a wire mesh into the concrete to take care of the stress caused by the growing roots. He patented his idea and afterwards extended its use to pipes and reservoirs. Previous to the time of Monier's patent M. Lambot built a small boat with a 1½-inch concrete shell reinforced with wire netting. This was exhibited at the Paris Exposition in 1855. Lambot, however, made no further use of his idea, which he apparently never considered as anything but a novelty. The wartime use of concrete for ships, however, lends interest to the record of the first concrete boat built two generations earlier.

Reinforced concrete developed very slowly for many years after Monier's taking his patent. A building in New York State designed by W. A. Ward in 1875 and the Leland Stanford Jr. Museum built by Ransome in 1890 were the earliest all-

© *Underwood & Underwood, N. Y.*

The Dome of the Pantheon, Rome, Is a Famous Example of Roman Concrete Construction

concrete buildings in this country, although at that time concrete was becoming a serious competitor of steel grillages for foundation work.

Fig. 1

The early history of reinforced concrete is largely a history of patented reinforcing floor "systems." The underlying reason for most of the systems was simply the necessity of having something a little different from the other fellow in order to avoid paying him royalty. The early systems had to do with both the shape of the reinforcement and its disposition in the floor. Nearly every geometrical shape excepting the circle was used for rod cross-sections. The rolled structural shapes were naturally carried from the old form of construction to the new, and angles and I-beams were largely used. Diminutive I-sections were then used, as were rods with a Latin cross for a section.

The *Engineering News* for September 8, 1888, has an article on concrete design. It is illustrated with a drawing for a cast-in-place cornice reinforced with round rods—a very modern appearing sketch excepting for the absence of stirrups. The text of the article is mainly concerned with the superiority of Mr. Ransome's twisted square bar over Mr. Hyatt's flat bar. The principal argument against the latter was the expense of punching holes for the cross wires needed for bond. Mr. Hyatt was, by the way, one of the pioneers in concrete work as well as being a noted citizen. He published a treatise on concrete in 1877 and was granted one of the earliest patents in this country for concrete construction. In his patent claim he outlined the purpose of reinforcement as used today and mentioned the advantage of a rolled deformed bar which he proposed to manufacture. Flats were much used in the early days because of their greater bond surface for a given cross-section. They were usually set on edge but were sometimes laid flat in beams and bent into parabolas to follow the lines of maximum tensile stresses.

An interesting example of the use of systems long since passed is the Cottancin System shown in Fig. 1. The excrescence below the slab was called a "spinal stiffener." These stiffeners were not laid out like a modern beam system. Æsthetic considerations weighed equally with structural requirements, for a text book, printed a score or more years ago, says that these spinal stiffeners crossed each other at various angles and that "wonderfully graceful and artistic effects are thus obtained." Patented systems in concrete construction are not entirely a thing of the past. They continue down to the present, but they are now used in only a small part of the total concrete construction.

The use of concrete in any quantity commenced in this country with the beginning of the present century, and even in these two decades changes in both theory and practice have been great, as can be readily observed by looking over any 20-year old book on concrete. Twenty years ago concrete was mixed very dry; as one old book says, "It must not show any moisture after continued tamping." Spading was unknown, the concrete being pounded and tamped the way backfill should be—and is not—in street trenches. Mechanical mixers were somewhat of a novelty and were not considered by everyone as equal to good hand mixing. Design also was different. Theories were well worked out, but the parabolic distribution of stress on the compression side of beams was used instead of the straight line distribution. Formulæ were long and cumbersome. As one writer aptly expressed it, judging from the formula the moment arm of the T-beam "looked as fearsome and was as long as the famous arm of the law."

It was considered necessary in those days to anchor the ends of all rods mechanically—usually with plates and nuts. It is related of the contractor's resourcefulness, on one of Boston's early concrete buildings, that when he ran short of the 6-inch square steel plates which the plans called for on the ends of the rods, he had similar wooden pieces painted black and went right on with the pouring of the concrete. It is presumed that he did not consider it necessary to trouble the inspector over so small a matter.

The general trend of changes in concrete work, as we come down to the present time, has been simplification. This has been true of both design and construction. Simplification has not come in the form of standardization, as with structural steel, and after reviewing the early history of concrete and reading of the many who viewed with dismay the introduction of the dangerous fad of the use of concrete, one is particularly reluctant to make any prediction. Nevertheless, it seems very doubtful if concrete construction usage will ever become a matter of selection and use of standard sections. This is partly because of the extent of field rather than factory manufacture and partly because it is the ready adaptability of concrete to any size or shape which makes it useful in such a variety of ways and places today.

Foundations were the first structural parts in which concrete was largely used. Once it was demonstrated that concrete could take the loads, the simplicity of its use for pile capping as compared with the use of granite levelers was obvious. The danger of corrosion in the use of iron or steel made

the use of concrete in place of steel grillages increasingly common until at the present time concrete footings are used almost universally. At first they were un-reinforced and stepped like a natural stone foundation. Reinforced footings followed closely upon the introduction of concrete floors. The use of reinforced footings is purely a matter of economy. Where the bearing area is large enough to require a stepped footing, the introduction of reinforcing will usually effect a saving in concrete and excavation which will more than offset the cost of steel.

Concrete piles are of comparatively recent origin, but the availability of an indestructible pile is of immense advantage in many cases. Large single concrete piles of the caisson type are sometimes built to carry the load down to a satisfactory bearing soil, and are used with great economy in certain places. They are particularly adapted to Boston's soil conditions. Concrete foundations naturally suggest concrete walls to go on them, and concrete is largely used for all types of substructure walls, rubble stone for small houses being its only competitor. It is of course also used for retaining walls.

Concrete floors came into being because of the realization that exposed iron and steel construction was far from fireproof. Terra cotta fireproofing for structural steel was later developed, but the lesser cost of concrete under most conditions has brought about its continued rapid development. Even with steel framing, concrete is often used for slabs, the only alternative for a fireproof floor being terra cotta arches. Concrete floors are used as reinforced slabs, not as arches, and commonly with concrete beams. Floors resting on the ground are universally of concrete.

Concrete beams follow naturally from concrete slabs. They are heavier than bare steel beams or steel fireproofed with terra cotta and they often require more depth. In fireproof construction, however, the depth of a concrete beam includes the depth of the slab, while with steel beams the entire beam is below the slab unless slab continuity is to be sacrificed. Excepting for very long spans and light loads, concrete beams are less expensive than steel beams. The use of concrete for grade beams and strap beams for cantilevered foundations is a natural development. Concrete columns started as substitutes for brick and granite piers. With the development of concrete they are available and practical for factory and warehouse buildings up to about 10 stories, and they are also being used in schoolhouses and similar buildings for three or four stories.

Concrete soon became increasingly popular for sidewalks. With the advent of self-propelled vehicles, it was found that the best water-bound macadam roads were unable to stand the tractive power of the driving wheels. This resulted first in tar-bound macadam roads of various types, and then in concrete roads. The latter are becoming increasingly popular and at present their construction is using a considerable part of our cement production.

But besides the use of concrete in large buildings, there is a great field for its use in small dwellings and on farms. The cement companies have very properly been calling our attention to these uses of concrete for many years. In smaller residences concrete is used as a matter of course for basement and cellar floors, and almost as much for foundations and walls. The concrete wall can be thinner than the masonry wall and can be made waterproof. A concrete first floor makes a frame house practically fireproof. In many cities a cement plaster on metal lath over the heater is a minimum fireproofing requirement. Concrete firestops in metal lath baskets between studs at floor levels also greatly lessen the fire risk at a small cost. Concrete slabs are useful for loggia floors and for hearths. The latter may sometimes be cantilevered out from the chimney if it is of sufficient size. This makes a self-contained support for a fireplace, entirely independent of framing.

On the outside of the house there is of course stucco with its wide use for finish and concrete for the various walks, drives, retaining walls and steps, not to speak of pools and garden furniture. Exterior steps and walls can be made as unobtrusive as wood or granite, or with the plasticity of the concrete and variety of easily obtainable aggregates can be fitted into the decoration.

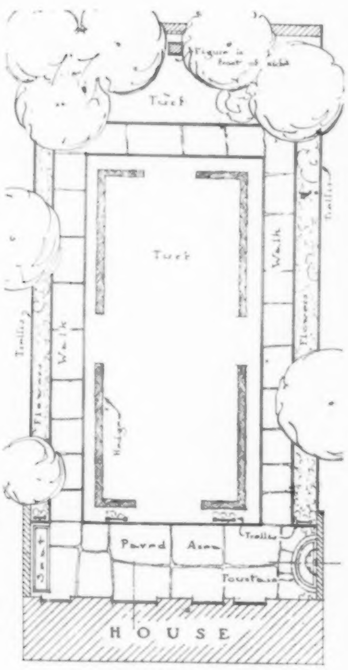
In farm groups the uses for concrete are almost limitless. Concrete walks and alleys connecting the various buildings are a luxury in some places but a necessity in other places where winter or rainy season brings heavy mud. Exterior concrete platforms are used for wash floors for cars and other vehicles, and concrete feeding platforms are sanitary and save the feed from being trampled into the mud.

Water and feeding troughs, cisterns, elevated water tanks, silos, and perhaps with the present trend of time we may add fuel oil tanks, are all satisfactorily made of concrete. In barns and stables two requirements make for the use of concrete—first, the advantage of permanent fireproof construction, and second, the need for cleanliness. This construction has the further advantage of being ratproof. There are also the uses of concrete for miscellaneous minor buildings,—garages, corn cribs, milk and pump houses, root cellars and ice-houses.

Since every architect must use concrete at some time, he needs a good idea of its manufacture and use, and unless he has both the interest and time to become quite familiar with constantly improving practice he needs to know where he can get dependable advice on his larger work. Concerning concrete work it may be said that the country as a whole follows Pope's injunction—"Be not the first by whom the new is tried, nor yet the last to lay the old aside." The east is not the first to try the new and the west is not the last to discard the old.

A Small City Garden

AT REAR OF OFFICE OF RUTH DEAN, LANDSCAPE ARCHITECT, NEW YORK



Garden Plan

Detail at End of Garden

WITH the popularity of remodeled old city houses for modern residences there has come an appreciation of the garden possibilities of their rear yards. These individual spaces are, of course, comparatively small because the width seldom exceeds 25 feet and the depth probably twice that figure. Luxuriant and heavy foliage is not possible because of restricted sunlight, nor is it desirable; these spaces are best considered after the manner of the small inner courts of old Spanish and Italian houses in which simple architectural and sculptural forms contribute as much of the garden feeling as the flowers and shrubs. The accompanying illustrations show a simple and interesting treatment at the rear of Miss Dean's office in New York.

Opposite Ends of Terrace against Building

ENGINEERING DEPARTMENT

Charles A. Whittemore, *Associate Editor*

Elevator Installation

PART I

By HERBERT M. GARRIOTT, ARCHITECT

ELEVATOR installation in the modern building project of any magnitude presents a problem varied and complicated enough to delight the technical heart of any trained engineer. To the architect in many cases this problem is entirely one for the engineer's solution, and the necessary spaces and structural provisions for an efficient installation are neglected and at times totally ignored on preliminary sketches and the resulting drawings; but the architect, general contractor and elevator contractor will work to a disadvantage, and complications are sure to develop unless full particulars and details of elevator shafts are decided upon and furnished each interested party well in advance.

In laying out an elevator installation one of the first things to be determined, of course, is the speed and the load. Under the generally accepted regulations passenger cars are figured at the rate of 75 lbs. live load per sq. ft., while cars to carry freight are figured at a capacity determined by the purposes for which they are to be used. The speed of the car determines to a certain extent the size of the machine, and when arranging for the overhead work this, of course, must be taken into consideration.

If the machine is to be mounted over the hoistway, the slow-speed car, that is up to 200 ft. a minute, can usually be accommodated within the limits of the hoistway, although this is not always possible. With a high-speed car the penthouse to enclose the machine must be considerably larger than the hoistway. It is therefore imperative that the layout of the elevator work be determined before the final framing plans are drawn, so that provisions may be made at the proper time to care for the increased size as well as the increased loads of the overhead construction.

In figuring the beams to carry the machine, the loads are usually doubled "for shock." That is, if the car drops freely and comes to rest on the quick action of the safeties, the shock on the overhead beams is not only the shock of the car but also of the counter-weight, so that the beams must be figured not only sufficiently heavy to carry the load of the car and the counter-weight but must be doubled on account of the additional impact.

Frequently elevators are installed in such a manner that the lowest stop level of the car is not the lowest portion of the building. If, for any reason, the space below the hoistway is to be used other than for the machinery of the elevator proposed, it is absolutely necessary, as well as a code requirement, that the bottom of the shaft be designed and framed so that there will be no possibility of the car dropping through and injuring occupants of the space below.

As an illustration of the effect of the falling car, one accident which came to the writer's attention may be worth mentioning. The car fell through three stories and came to rest on some old-fashioned, obsolete type bumpers which were carried across an

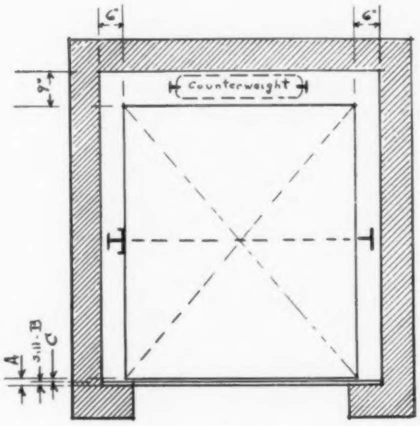


Fig. 1

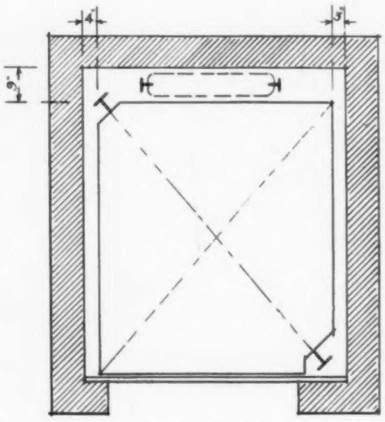


Fig. 2

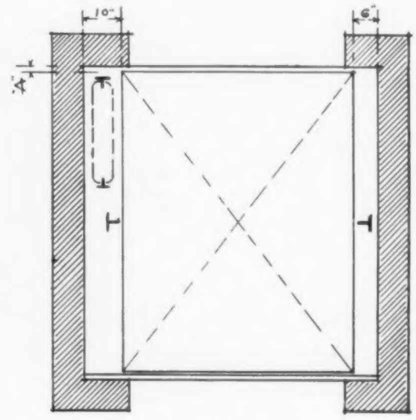


Fig. 3

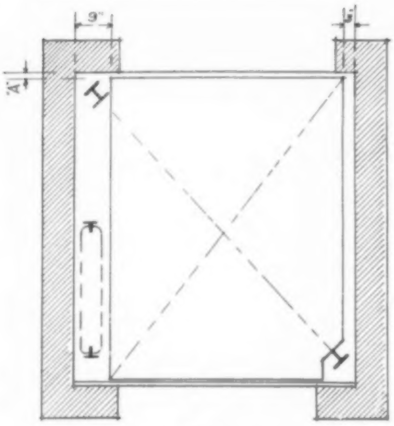


Fig. 4

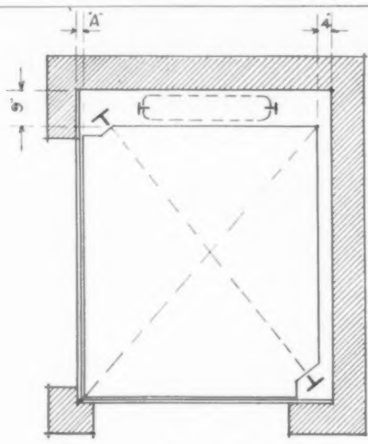


Fig. 5

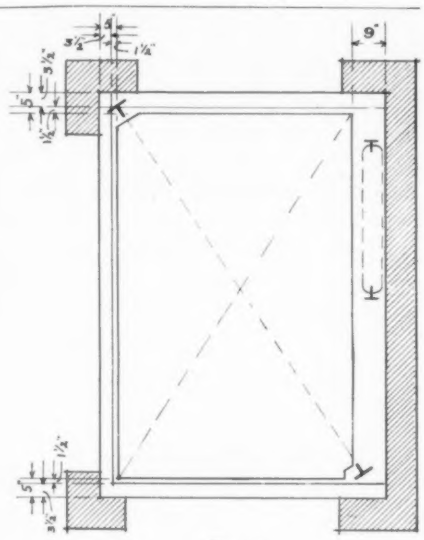


Fig. 6

TYPE	A	B	C
PASSENGER	1½"	½"	1"
PUSH-B'TN.	4"	3"	1"
FREIGHT	5"	3½	1½

CLEARANCES AT CAR OPENING

8 ft. hoistway on 4 x 4 angle irons, and the result of the dropping of the car, as far as equipment was concerned, was to shear off two bolts and bend the angle iron so that the level of the bumpers was approximately 4 ins. below the normal level.

Engineers have not yet evolved a right method of calculating the impact stress due to a free falling car, as many elements enter into this consideration, but architects and engineers must be prepared in their layouts to reinforce the lower portion of the elevator shaft sufficiently to give protection to the space below.

The elevator contractor should be furnished special ¾ in. scale sketches showing general conditions existing in and around the elevator shafts. From these sketches, drawings showing the general arrangement of the elevator installation can be made by this contractor, to be in turn checked and approved by the architect. Copies of these drawings, after approval, should then be furnished each contractor having to do with the installation.

Pit and Shaft. The pit in connection with the shaft is of prime consideration. In the majority of cases, with the exception of traction drive elevators, a depth of pit of at least 3 ft. 6 ins. from lowest stop to bottom of pit should be allowed. For a traction drive installation a depth of 6 ft. and at times for the high speed type (400 f. p. m. or over) a depth of at least 7 ft. 6 ins. is necessary. Where the basement is the lowest stop it will obviously be necessary to carry the shaft pit into a sub-basement or to provide a special depression below the floor. Footings for columns and foundations in connection with the shaft should be kept below the bottom of the shaft pit in order that the finished lines of the shaft may be uninterrupted.

The waterproofing of pits and of machine rooms, where they are built in connection with the pits, is a very important consideration. There are various approved ways of waterproofing this type of construction, and no doubt each individual architect has his preference. It should be remembered that it is very necessary that machine rooms be quite dry, and whatever system of waterproofing is used it should be carried under all machine foundations.

There are many considerations which should enter into the exact dimensions and the detailing and constructing of the elevator shaft. Some structural characteristics may require that the corner post type of installation be used, or in other cases the side post type may be more practical. Specific clearance space is required by most building codes between

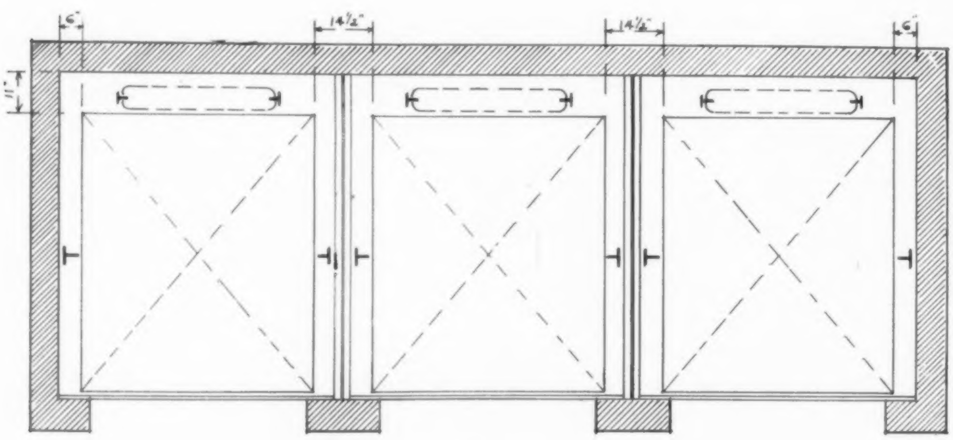


Fig. 7

sides of car and walls of shaft and between floor saddle and floor of car ("A," Figs. 3 and 4).

There is a possibility of there being doors on more than one side of the shaft, and this condition may determine the location of counter-weights. Figs. 1 to 9 illustrate different types of shafts, posts and openings and the required clearance dimensions in each case. Figs. 1 and 2 illustrate typical examples of installation with elevator openings in one side of shaft only. Where the width of shaft is limited it is possible to save some 4 ins. of width by using the corner post installation. It will be noted, however, that when the corner posts are used the widths of car and shaft openings are more restricted and the door is not on car center.

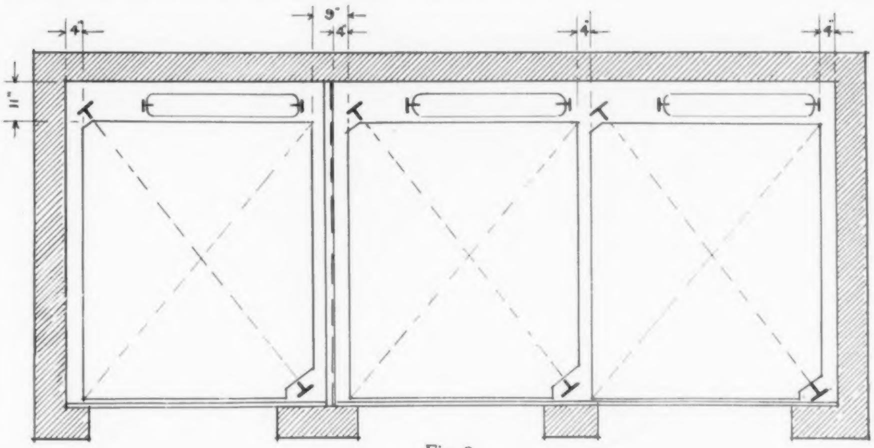


Fig. 8

Figs. 3 and 4 show arrangements for doors on opposite sides and the same remarks pertaining to width of shaft just made will apply. The use of doors on opposite sides for passenger service requires of course two automatic door locks at each stop and equipment which will allow the operation of either door by the operator without leaving his post. In Fig. 5 is illustrated the most logical use for the corner post installation — a shaft where doors on adjacent sides are necessary. It is easily seen that in this case the use of side posts is impossible.

Fig. 6 shows an exceptional installation where openings are required on three sides. This type of shaft construction is sometimes found in freight elevators, but very seldom in passenger elevator installations. Figs. 7 and 8 show a usual method of installing a bank of cars, Fig. 7 showing the side post and Fig. 8 the corner post type. As in Figs. 1 and 2, the only advantage of the corner post installation is a saving of space in width of shaft. Fig. 9 illustrates a more approved method of construction for a bank of two or more cars and represents quite a saving in width of shaft.

Guide posts must in every instance be securely anchored at regular intervals to avoid deflection, caused by vibration and impact due to car stops. In the detail drawings of shafts to be turned over to contractors all fireproofing and plastering in the shafts should be shown and exact thicknesses marked.

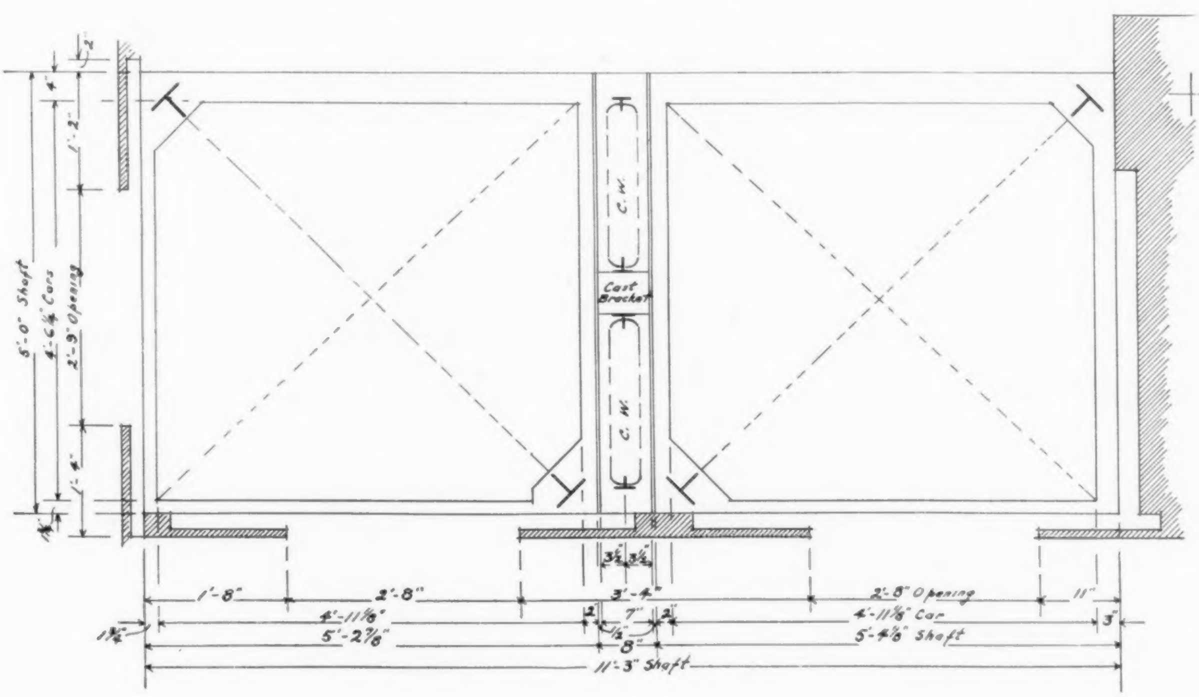


Fig. 9

Elevator Machine Rooms. With the hydraulic elevator type the machine room should be located under the shaft at the lowest level, or at least directly connected with the bottom of the shaft. The hydraulic geared type is very little used of recent years, and the remarkable development of the electric type of installation has left but a very limited field for even the hydraulic plunger elevator. The mechanical equipment in connection with the hydraulic plunger elevator consists of a plunger operating within a cylinder which is protected below the surface by an iron casing. The plunger, which at its top carries the elevator car, is controlled by water pressure within the cylinder. In connection with this water pressure system is a pumping unit, excepting very rarely where the system is operated by pressure from mains. This equipment may ordinarily be provided for below the elevator shaft.

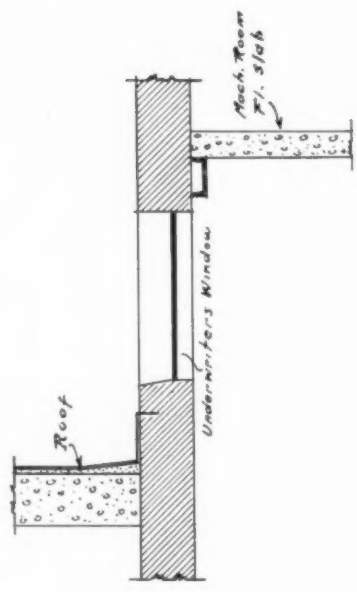


Fig. 10

Electric drum type or traction drive machines may be located either in the basement, directly over the shaft or on any of the intermediate floors. It would seem, as a matter of space economy, good practice to locate the machine room over the shaft, in a bulkhead or penthouse. In this case the floor of the machine room should be a solid concrete slab with small openings or slots, only large enough to permit unobstructed passage for the cables. With this arrangement direct outside light and ventilation must be provided in the shaft under machine room floor slab, somewhat as shown in Fig. 10, unless the shaft is located on outside wall. Shaft windows must be approved fire underwriters' windows with fusible link.

Another point in favor of the overshaft machine room is the ease of lighting when it is thus located. The overshaft location is much freer from the accumulation of dust and dirt, machines are more easily accessible for repair and maintenance, and a length of cable equal to the full travel of the car is saved.

Types of Elevators

Hydraulic Elevators. The geared type hydraulic elevator is practically obsolete. The plunger type hydraulic is used principally at present in a limited field, where rises and loads are such that the available water pressure will permit of plungers of small section with a resultant small water consumption and cost.

Electric Elevators. The remarkable development of the electric type elevator after its introduction in 1889, the more recent improvements in motors, controllers and mechanical parts, and particularly the development to something near perfection of the electric gearless traction type have made this type by far the most desirable installation for the modern building. The attainable speed with smooth, positive operation has greatly added to the favor accorded this type by engineers of today. It has another great advantage in that the machine and all mechanical equipment can be located over the shaft. This means the saving of space in the basement, which is often quite valuable. With the gearless traction type no cables are wound up, since the movement of the car is accomplished through the traction between sheave drums and one set of cables connecting at one end with the car and at the other with the counter-weight; hence the width of drum or driving sheave and the size of machine for a given capacity remain at a minimum.

In this type of elevator a slow speed motor is directly connected with the driving sheave and break pulley by a shaft which assures a minimum loss of power due to friction.

Elevator Controls. The different methods of controlling elevator car travel are hand rope, lever and hand wheel, electric switch and push button. Hand rope control is applicable only to slow-speed freight elevators. Lever and hand wheel control require more space allowance in the elevator shaft than the electric switch control and are obsolete.

The mechanical parts of the electric switch control are placed inside the car so that no additional shaft space is needed. The switch handle automatically resumes the neutral position if released when in operation. The movement of the switch handle from the neutral position energizes various magnet coils on the controller, and these magnets complete circuits which control direction and speed of the car and the operation of the motor and brakes.

The push-button type of control is entirely automatic in operation, and if properly installed is safeguarded against any mishap. In the elevator car is located a series of push-buttons, each button marked with the number of the floor to which its manipulation will dispatch the car. When the particular floor designated is reached, the car is stopped by the automatic operation of the electric magnets which open or close the circuits operating the machine and brakes. On each floor also, near the shaft door, is located a push-button which automatically calls the car to that particular floor in the same manner as the operation of the buttons in the car. The system is so automatically safeguarded that the car cannot be operated until *all* of the shaft doors are closed and *locked*, and no shaft door can be opened until the car is stationary and before it.

In addition to the floor buttons in the car is an emergency button which stops the car instantly.

Electrical Wiring Layouts for Modern Buildings

PART V

By NELSON C. ROSS, *Associate Member, A.I.E.E.*

IN planning the wiring layout, provision should be made for telephone service, and where the building is large, local telephones should be considered in addition to the instruments of the telephone company.

Provision for Telephones. In sections where overhead telephone distribution is used, and where the building is so situated that the telephone lines may be carried direct from the pole on the street to the building, the telephone company usually makes the installation, without charge to the customer. In this case the wire passes from the pole to a bracket on the building, generally at a point 20 or more feet above the ground, thence down the outside of the building on cleats, and through the wall into the basement, where a protective arrestor is installed at the point of entrance. The wire is then run exposed, passing up through the floors and connecting with the instruments.

Any number of telephones may be installed in this way, as the wires are exposed and are simply stapled to the walls and to the ceiling of the basement. While this construction is less expensive than conduit wiring, it is unsightly and the wires are not protected from mechanical injury. Again, where the wire passes down from the bracket on the outside of the house, it may be easily cut by anyone contemplating mischief. It is therefore advisable to provide for a ½-inch conduit on the outside of the building for the telephone wire, the conduit passing through the basement wall in an elbow, or with a condulet fitting, a weatherproof head to be used on the conduit, at the bracket. This protects the telephone service wire from injury or mischief.

Where underground telephone service is used, a conduit is required from the property line to the building. The telephone company will provide conduit from the nearest manhole to the property line and will connect with the conduit on the property. It is sometimes advisable to get a price from the telephone company for the installation of the conduit on the property, and to include this price in the contract as an allowance, so that the telephone company may make the complete installation to the building.

In planning new work, however, it is well to provide a conduit raceway for the telephone wires, particularly when there are several instruments to be used. It is further advisable to run an underground conduit from the house to the nearest telephone pole and thus do away with the necessity of any overhead wires connecting with the building. With this system, a connecting cabinet, approximately 12 by 4 and fitted with hinged door and lock, is located in the basement at the point where the service enters, the underground conduit terminating in this cabinet. From the cabinet one or more conduits should run to the telephone outlets, using ½-inch conduit forone circuit and ¾-inch conduit for two circuits. The telephone outlets should consist of the standard 4-inch outlet boxes, fitted switch type covers, set flush with the wall. For wall instruments set the outlets 4 feet 6 inches above the floor; for desk instruments set the outlets approximately 18 inches above the floor, so that the ringer may be mounted over the outlet, the cord leading to the instrument. As there is likely to be considerable distance between outlets on residence work, it is well to insist that the conduits be fished as soon as installed, that a cord be drawn into the conduits, and each conduit plugged at the outlet. It is well, also, to require each outlet to be covered with a blank switch plate, this being removed when the wires are installed by the telephone company.

Local Telephones. In larger residences local telephones are commonly used, and the wiring plans should include all local equipment. The local or house telephones are independent in every way of the outside service. The instruments are located in servants' corridor or rooms, the butler's station, the kitchen, laundry, garage or stable, and in the corridors on each floor or in masters' rooms.

With but two or three local telephones to be considered, the single-point instruments for common talking and selective ringing may be used. With six or eight instruments, however, this system is objectionable, as but two can talk at one time, and anyone lifting a receiver can "listen in." With six or eight instruments the intercommunicating system is favored. This gives selective ringing and talking, and several may talk without interference. The instruments are made in both the surface and the flush types, and with the long or watch-case receiver.

On the intercommunicating instruments there is one button for each station, so that a ten-station telephone would be fitted with a ten-button plate. With this system one wire is used with each station plus four additional wires; thus with a ten-station equipment, a 14-wire cable will connect each instrument, and the connecting conduit must be large enough to take cable.

The conduits for these telephones must be continuous from instrument to instrument (see Fig. 1), and the splices should be made in a terminal block provided for these connections. A conduit from the nearest outlet should be run to the basement to provide for the battery. Dry cells are used as a rule, and these may be mounted on a shelf or in a small cabinet.

There are two battery circuits, one for talking and

one for ringing. If desired, the ringing circuit may be from a bell-ringing transformer, but a battery (usually of two or three cells) must be used on the talking circuit.

Standard cotton-covered telephone wire made up in cable form, and the whole surrounded by a substantial braid, is used on these systems. Where the cable is run underground to garage or to outbuildings, however, it should be sheathed with lead in addition to the braid.

Protective Circuits. Burglar alarm equipment, while used extensively in factory buildings, lofts, etc., is seldom used on residence work other than in isolated districts. On isolated residence work, however, it is well to consider the use of alarm equipment, particularly with reference to the stable and garage. The wiring of alarm equipment is the same as that required for bell circuits, and current is generally derived from a battery located in the basement, or through bell-ringing transformers. The system may be of the closed circuit type (where the opening of the circuit or breaking of any wire will set off the alarm), or of the open circuit type where the contact is closed to sound the alarm. For residence work the open circuit system is to be preferred.

In general, the system consists of switches or spring contacts installed at all points to be protected, as at the doors, windows, etc., an outlet being located at these points, and equipped with a spring contact, which is held open when the door or window is closed, and which closes and sounds the alarm as soon as the door or window is opened. The two wires of the circuit connect to all outlets, so that the closing of any one of the contacts will set off the gong. One gong or a number may be used so that help may be called from different points.

A master switch of the cylinder lock type is installed in a convenient place by which the circuit may be opened. Thus, during the day, the system is inoperative by the use of this switch, and in use as soon as the switch is closed. When it is desired to locate immediately the point of alarm, an annunciator is connected in with the system, so that the target shows up on the annunciator locating the point of disturbance.

Where alarm wires are carried to the garage or other outbuildings, the wires should be lead-sheathed and should be installed underground, as overhead wires could easily be tampered with. Standard protective devices for the alarm system include transom springs for transoms or for swinging windows, single- and double-window springs, shade springs which operate the alarm in the event of the shade being raised, door trips, floor springs for installation in front of furniture or safes, burglar alarm matting, and traps with which a cord is stretched across a corridor or path, the cord releasing a spring contact when disturbed.

The equipment is made for either momentary or continuous ringing, so that the alarm will continue to sound even if the door or window, etc., is immediately closed. The annunciators and gongs may be located at two or more points, working together, and any number of switches may be installed where desired to permit of local control of different buildings. Lock switches of the cylinder mortise type may be installed at certain doors and connected in the alarm circuit, so that persons with the proper keys may enter the building without sounding the alarm.

It is to be preferred that the wiring be installed in conduit or in armored wire. If expense is to be considered, however, rubber-covered wire may be drawn into stud constructions. Outlet boxes for all types of equipment are available and these are set at points permitting the switches and spring contacts to be mortised in door and window frames or elsewhere. Where the runs are long it is advisable to use No. 14 wire, and the circuits should be installed with soldered joints.

Door Openers. These openers are wired and connected up in the same manner as the bells and signals, the opener mortised in the jamb of the door and taking the place of the lock; or, if desired, the opener may be located above the lock. The openers may be operated from battery (four cells) or from a bell-ringing transformer. Wire should be not less than No. 16 rubber-covered wire. Any number of buttons may be installed in convenient places to operate one or more openers. Openers are, as a rule, used on entrance doors and yard gates.

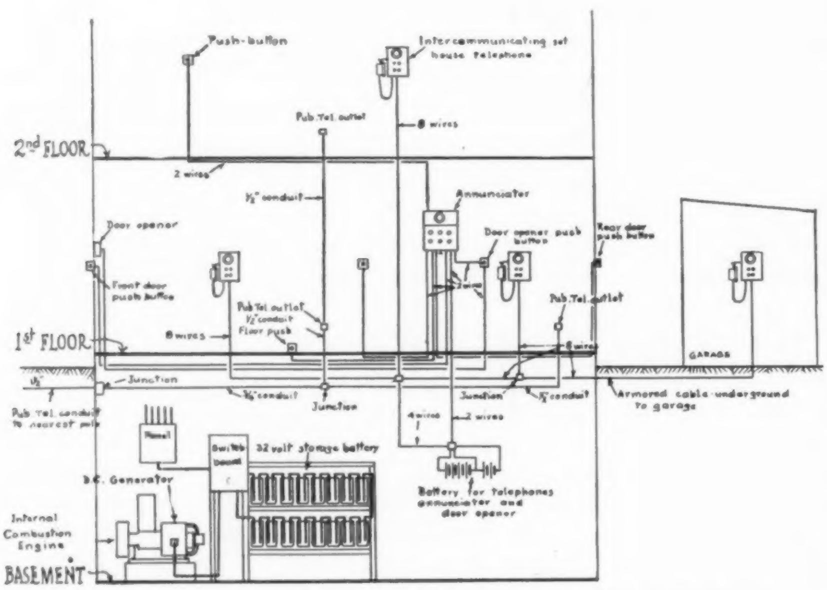
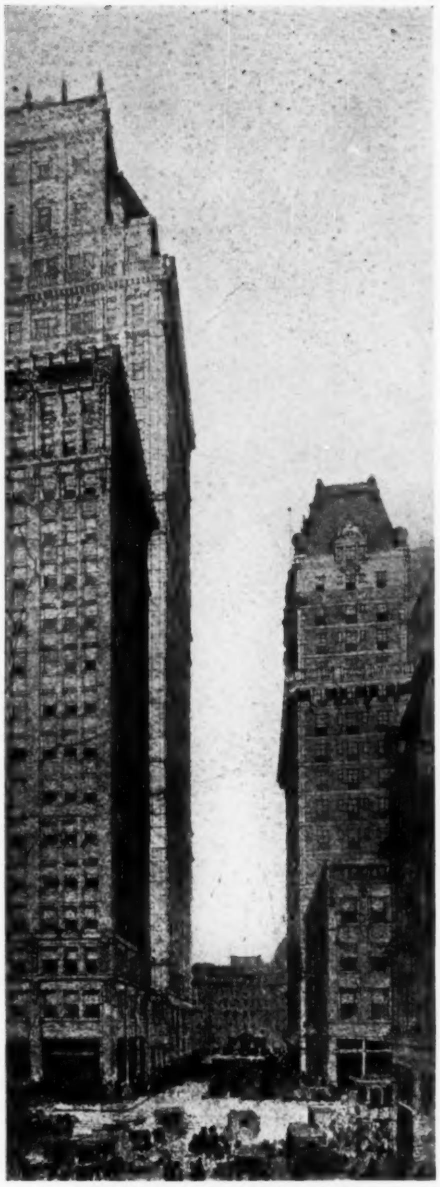


Fig. 1. Diagram Showing Installation of House Bell and Telephone Equipment with Local Generating Plant and Storage Battery

A Record of Architectural Achievement In the State of Texas

By RALPH H. BRYAN
Pres. of the Dallas Architectural Club



View down Akard Street, Dallas
Water Color Sketch by Dudley S. Green
Southwestern Life and Magnolia Buildings on the left
Adolphus Hotel on the right

IT has not been so very many years ago that the mention of the name of Texas brought before the mind's eye of the average Easterner a conventional picture. In this picture the Texas citizen appeared as a "cow person" who enjoyed eating tobacco; the typical Texas metropolis was portrayed as a wide place in the road, entirely surrounded by saloons, and in a hazy sort of way, Davy Crockett, water melons, Texas rangers and longhorns were very likely to be included. As for the architecture of Texas, aside from that state's splendid, ruined missions, the words "architecture" and "Texas" were simply not used together.

However real such a picture may have been in years gone by, it lacks greatly in likeness to the Texas of today. In this last generation the southwest has awakened to a realization of her own natural and commercial resources, with the result that she is enjoying a steady, healthy growth and perhaps even more than her share of prosperity, and with this prosperity and progress there has come, among other things, an appreciation of, and an earnest desire to create, better things in architecture.

Excepting for the missions of Texas, in the neighborhood generally of San Antonio, and the few though nevertheless inspiring examples of southern colonial, seemingly centered in Austin, the southwest has no early architecture to which it can turn for study or precedent, and unfortunately these examples, as few and as scattered as they are, have not had the care and preservation of which they are deserving. The first real era in which architecture was known and practiced, as such, came to the southwest with the period of "red sandstone Romanesque" in the eighties. Of this style there are still, perhaps unfortunately, abundant examples throughout Texas though they are gradually giving way in the growth of the towns and cities to better things. Since that period there has been steady progress forward in both the quantity and quality of architectural work.

The city of Dallas—second in population among Texas cities, but first in any number of more important ways, as its Chamber of Commerce admits—presents a record of progress which is typical of the progress of the southwest as a whole. Dallas' first big step forward in an architectural way came in 1898 with the erection of the Linz Building, a 7-story, fireproof office structure. This was followed in 1901 by the completion of the Wilson Building, a similar structure of 9 stories, and when in 1908 the 15-story, steel skeleton, fireproof Prætorian Building, the "first skyscraper in Texas," was completed, Dallas was on its way to its present position as, to quote the Chamber of Commerce, "the skyscraper center of the southwest, with 58 buildings 6 to 24 stories in height either completed or under construction."

Immediately following the armistice Texas enjoyed her full share of the nation-wide, post-war construction activity, San Antonio, Fort Worth, Houston, El Paso and Waco all having building programs that closely parallel that of Dallas. Texas has probably felt less than any other state the depression that has existed for the past several months in many parts of the country. Part of this may be attributed to the fact that several of the larger cities, Dallas included, have put the policy of the open shop into practice with the result that labor troubles to retard construction work have been almost negligible.

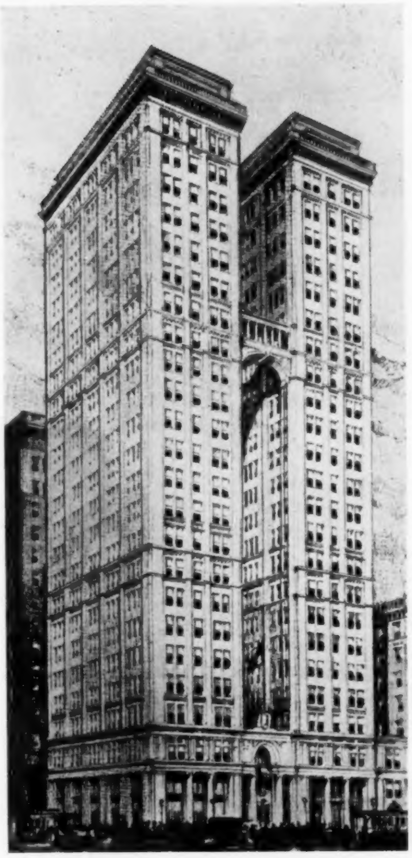
It is unquestionably true that credit for certain of Dallas' best architectural works goes outside of Texas, as for example that landmark of Dallas, the Adolphus Hotel by T. P. Barnett of St. Louis, the Union Terminal Station by Jarvis Hunt of Chicago, and the Forest Avenue High School by Wm. B. Ittner of St. Louis, and although much of the nota-

First Methodist Episcopal Church, South, Dallas
Herbert M. Greene Company, Architects

ble work which is now being done in Texas is due entirely to Texas architects there are several instances in which local architects have worked in collaboration with those from elsewhere, proof of the good spirit in which local firms co-operate with architects from the large cities outside the state to obtain good architecture, and proof also that architects have a higher regard for architecture than for their own personal advancement.

An instance of such co-operation is the Magnolia Building, in Dallas, which is perhaps the most important single architectural achievement of Texas, the work of Alfred C. Bossom of New York in association with Lang & Witchell of Dallas. When completed this structure will be 29 stories in height, towering above the already inspiring skyline of Dallas. Two of the largest ecclesiastical buildings in the entire southwest, now in course of erection, are entirely the work of Texas architects, the First M. E. Church, South, in Dallas of which the Herbert M. Greene Co. are architects, and the First Baptist Church at Houston, designed by C. D. Hill & Co. The museum designed for the Houston Art League is the work of William Ward Watkin. The Scottish Rite Cathedral at San Antonio, the dignified exterior of which suggests the purpose for which the structure is intended, is also the work of the Herbert M. Greene Co., and the recent addition to the Jefferson Hotel in Dallas is the work of Lang & Witchell who were the architects of the original Jefferson, while notable among recent

Girls' Home for the Y. W. C. A., Dallas
Herbert M. Greene Company, Architects

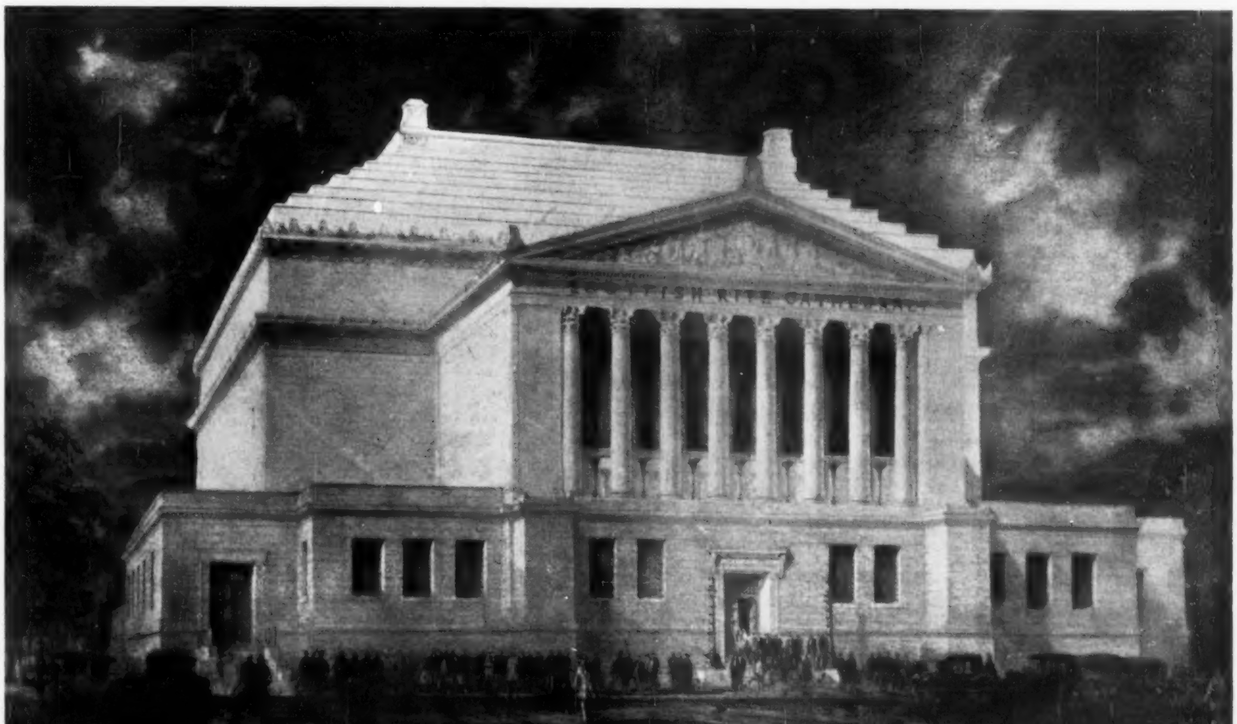


Magnolia Building, Dallas
Alfred C. Bossom, Architect
Lang & Witchell, Associated

Texas office structures is the Waggoner Building in Fort Worth by Sanguinet & Staats.

The buildings mentioned are only a few examples of thearchitectural work typifying the spirit of this section of the country. There are other individuals and other firms whose names are linked with the architectural progress of the southwest, men whose vigorous pursuit of all that is for good in their profession is more and more emphatically calling the attention of the country to the results which they are accomplishing. The opportunity which an increasing volume of work affords to the architects of Texas was well brought out in the recent exhibition of the Dallas Architectural Club, which, it may be observed in passing, was unique in that it was the first architectural exhibition of any magnitude ever held in

Waggoner Building, Fort Worth
Sanguinet & Staats, Architects



Scottish Rite Cathedral, San Antonio
Herbert M. Greene Company, Architects

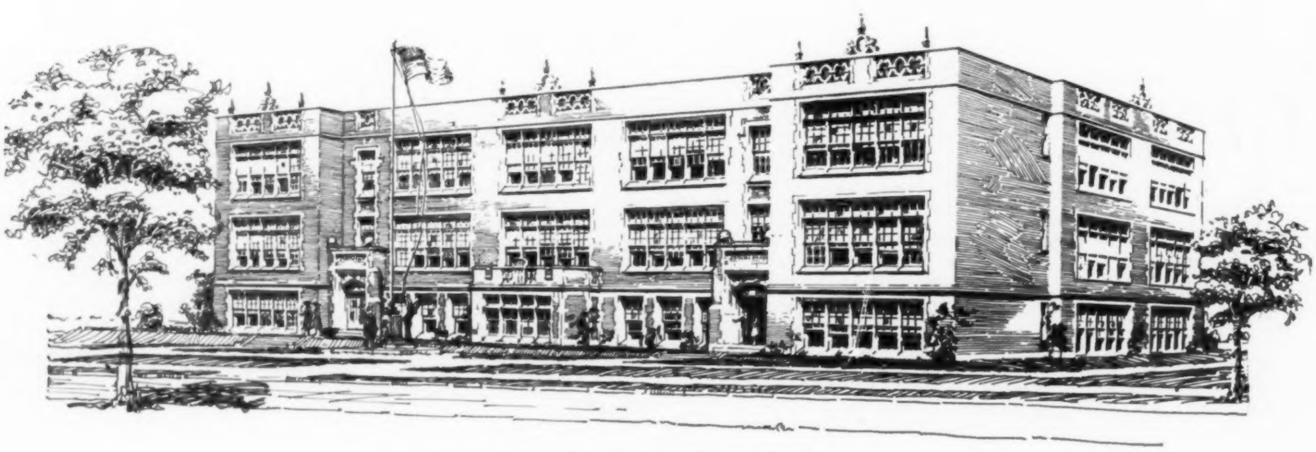
May, 1922 THE ARCHITECTURAL FORUM 191

Forest Avenue High School, Dallas
Wm. B. Ittner, Architect

Texas, and in that it included only work in which architects of the state have been engaged. It was an inspiring exhibition and proved that the future architectural advancement of Texas is in competent hands.

There has long been a feeling in this state that the members of the profession in the east look upon "architecture as she is practiced" in Texas in a patronizing sort of way. The east has had centuries in which to build up her record of architectural achievement of which she and the whole country are so justly proud; so Texas, despite her youth, has no excuses to make for her progress. Perhaps it is in some measure due to this feeling that the profession in the southwest is making such efforts to work for all that is good in architecture, and perhaps one of the reasons for this article is the desire to bring about a keener appreciation of the fact that all through this section there are men who are giving the best there is in them for the betterment of the profession.

DALLAS FEDERAL RESERVE BANK. The building which houses the Dallas branch of the Federal Reserve Bank, one of the most notable additions to the city's architecture, is the work of Graham, Anderson, Probst & White. The exterior exhibits a successful adaptation of classic design to the requirements of a modern business structure and has been worked out in Indiana limestone. The entrance to the building is within a recess in the main facade, the heavy columns which separate this recess from the street upholding the entablature



Junius Heights Grade School, Dallas
Herbert M. Greene Company, Architects

192 THE ARCHITECTURAL FORUM May, 1922

House for A. E. Parker, Esq., Dallas
Anton F. Korn, Architect

which extends around the structure between the third and fourth stories, while just above the entrance and resting upon the entablature are placed a heavy cartouche and carved eagles which relieve the severity of the facade.

Although it is situated on a corner, the area of the building makes necessary a light court which extends through all the stories above the ground floor, the cages of the tellers being grouped at the center of this floor and lighted from a skylight in the lighting court. An elevator close to the main entrance of the building gives access to the bank's working quarters in the upper stories, but the greater part of this ground floor is occupied by the necessary public spaces and the offices of the Governor, the Federal Reserve Agent and the other officials of the bank and their secretaries. At the rear of the building there is a truck enclosure into which currency trucks may drive, being locked in while they are being loaded or unloaded, and a lift from this

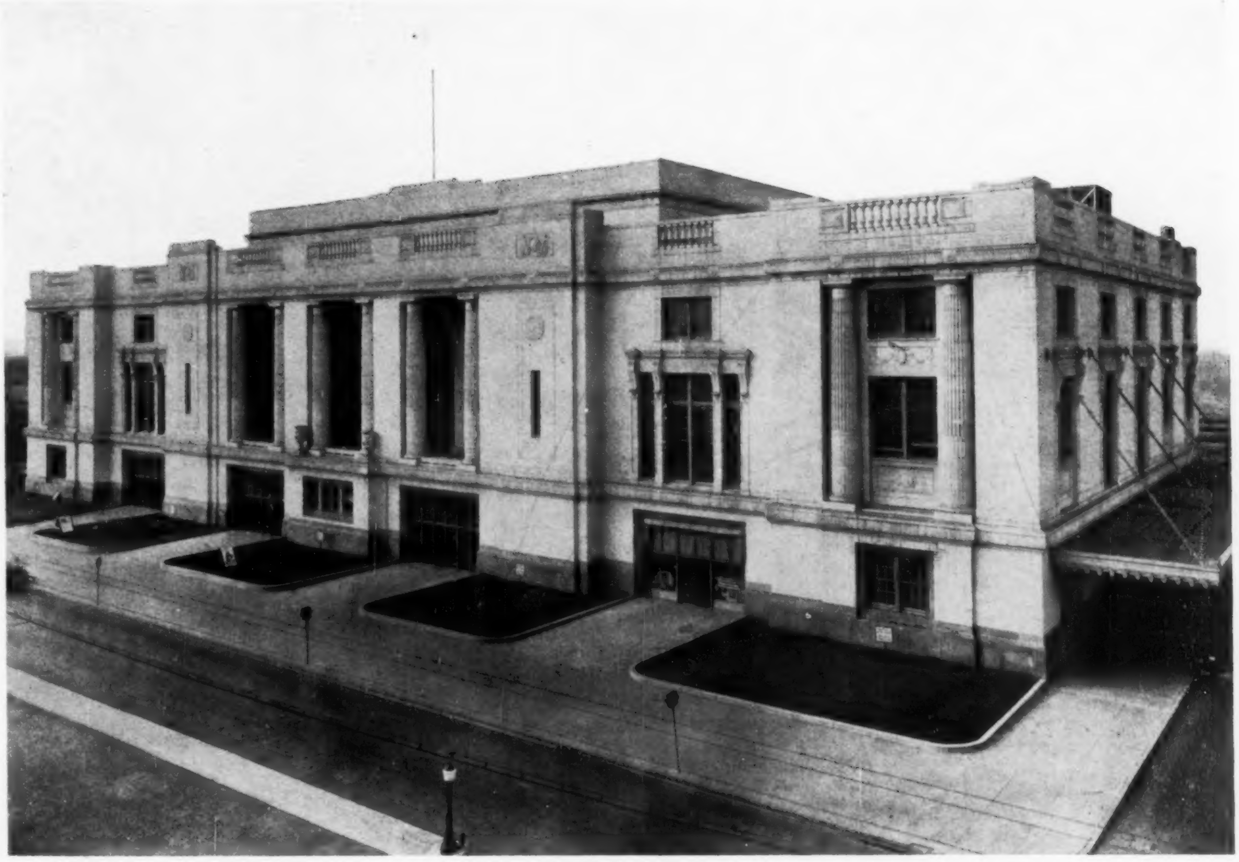
Museum for the Houston Art League, Houston
Wm. Ward Watkin, Architect

Jefferson Hotel, Dallas
Lang & Witchell, Architects

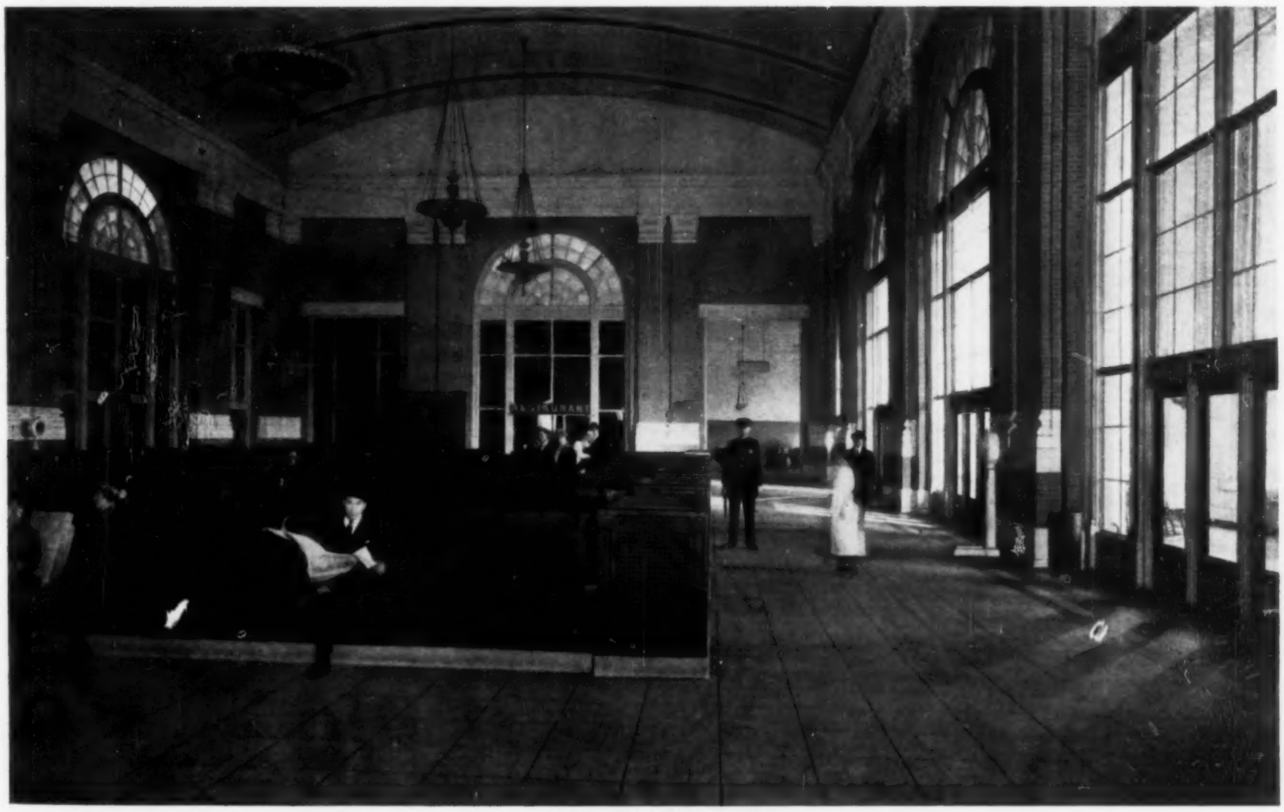
entrance communicates directly with the great vaults. To afford all possible safety these vaults are placed in the basement and at the center of the bank's area; but one entrance leads to the vault's entrance and but one to the inner enclosure, and opening from the outer enclosure are numerous small offices or cages for the counting of currency or checking up of deliveries. From the inner enclosure a spiral stairway leads to the tellers' cages upon the main floor above.

The floor plans included here show an arrangement of all the various departments required in a branch of the Federal Reserve Bank. The second floor is in effect a mezzanine since it extends about the four sides of the main banking room, the greater part of which is the equivalent of two stories in height. Upon this floor, which is reached both by elevator and stairway from the ground floor, are the offices of the auditing department, the credit, loan and discount departments and special storage spaces for their use. Above the main floor there are the incoming and outgoing transit departments, coupon rooms and conference rooms, while a particularly well lighted space is occupied by the bookkeepers. To the stenographic corps there has been assigned a well lighted corner space upon the fourth floor since it has been found that the clicking of a large number of typewriters interferes with the business of a bank if they are used in those parts of the building to which the public has access, and yet they must be near at hand.

The "Dallas Canyon," Looking East on Main Street
Showing the principal high buildings erected in recent years



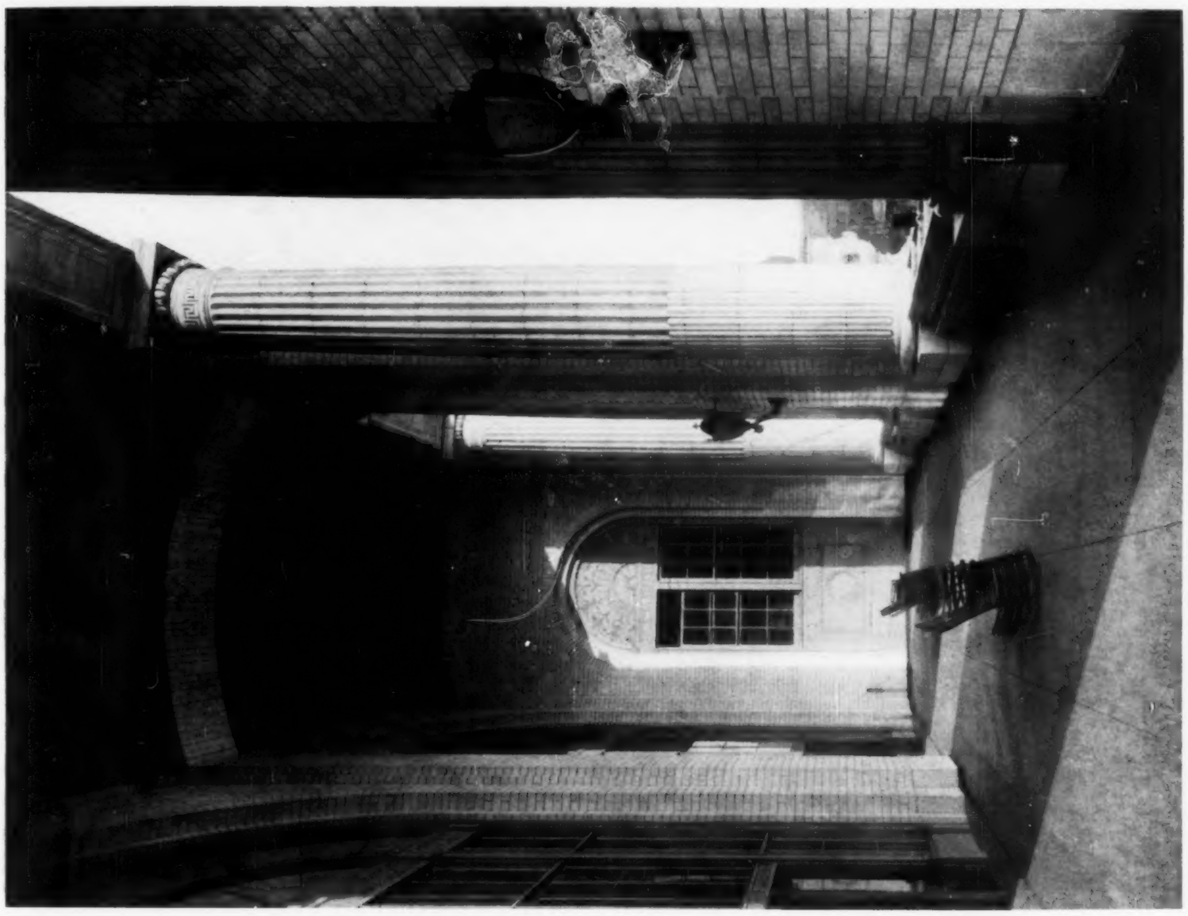
GENERAL VIEW



MAIN WAITING ROOM

UNION TERMINAL STATION, DALLAS, TEXAS

JARVIS HUNT, ARCHITECT



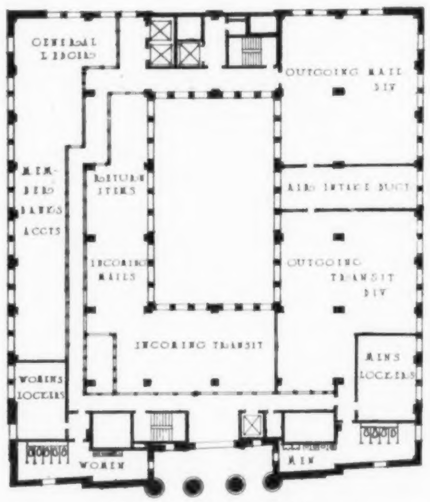
WAITING ROOM LOGGIA

SECOND FLOOR PLAN

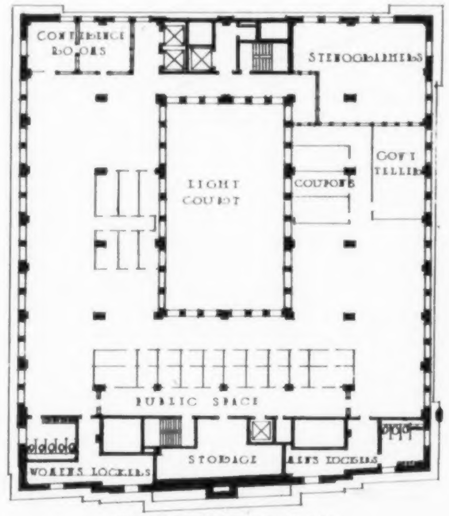
FIRST FLOOR PLAN

UNION TERMINAL STATION, DALLAS, TEXAS

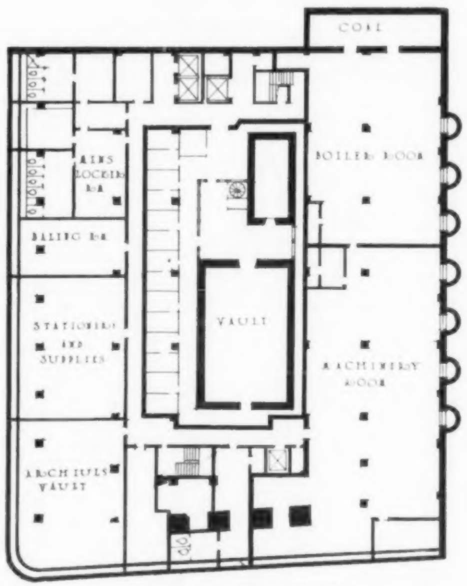
JARVIS HUNT, ARCHITECT



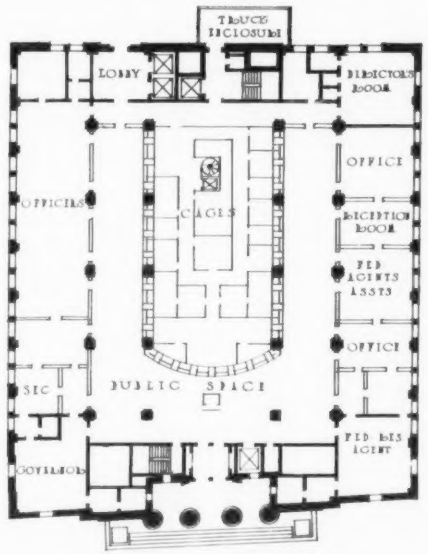
THIRD FLOOR PLAN



FOURTH FLOOR PLAN



BASEMENT FLOOR PLAN



SCALE 0 20 40 60 FEET

FIRST FLOOR PLAN

MAIN FACADE

FEDERAL RESERVE BANK, DALLAS, TEXAS

GRAHAM, ANDERSON, PROBST & WHITE, ARCHITECTS

The Regent Theater, Brighton, England

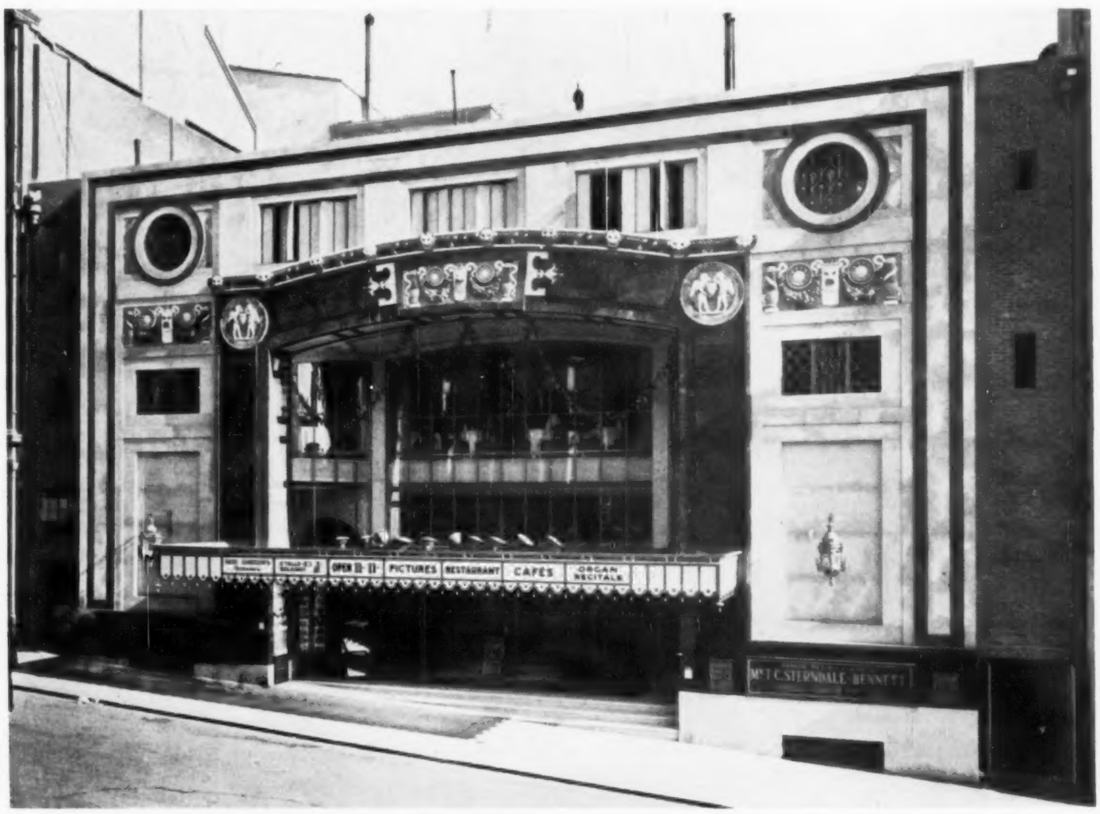
ROBERT ATKINSON, F.R.I.B.A., ARCHITECT

THE rapidly increasing popularity of motion pictures, which has made their production one of the greatest of industries, has been the cause of many interesting developments in buildings intended for their exhibition. The modern cinema or motion picture theater differs in certain respects, in function as well as in plan, from the usual theater devoted to the drama which is generally intended for the production of regular theatrical performances which last for several hours— all the time during which patrons are in the building; the cinema theater, on the contrary, caters to an audience which comes and goes at will, and the management of such a house realizes the possibilities held forth by restaurants, tea rooms and rooms for dancing and other forms of diversion for patrons who have wearied of the cinema itself.

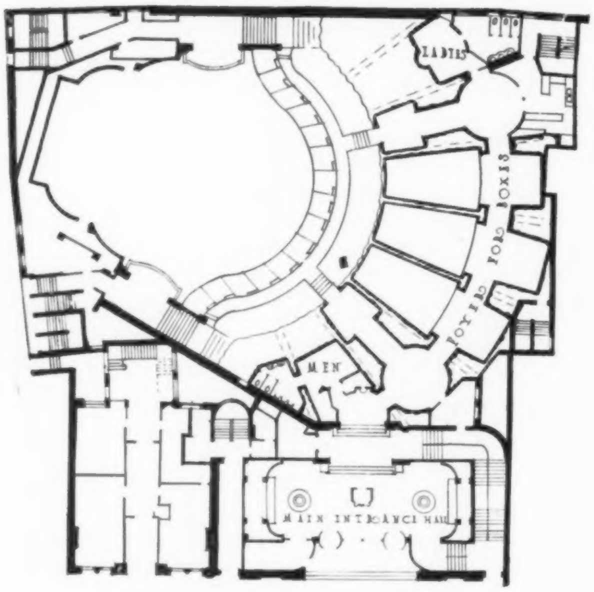
Brighton is the English equivalent of Atlantic City—a seashore town in the south of England and not too far from London to make it popular, and at Brighton there is presented every possible form of amusement apt to interest visitors in a holiday mood. The Regent Theater at Brighton, therefore, has been planned with a view to making it literally the last word in cinema houses, and it represents the outcome of years of effort to improve and develop the cinema theaters owned by a great firm of producers.

Exit to Foyer from Orchestra Aisle

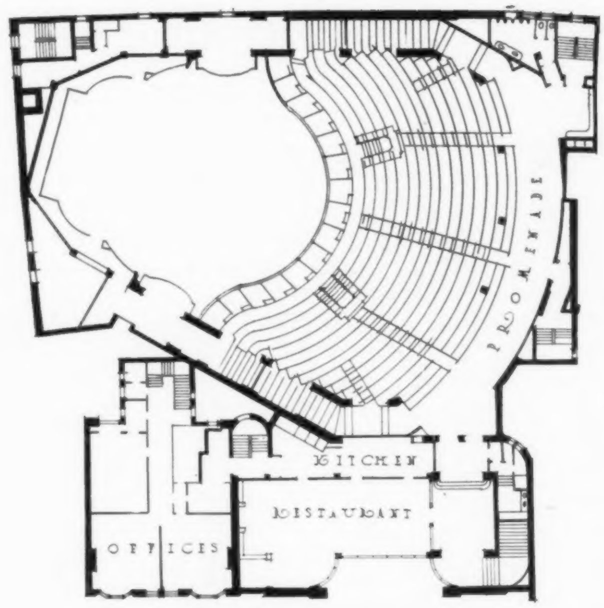
The site upon which the theater is built presented difficulties calculated to tax the ingenuity of its architect, for it is sufficiently near to a corner to afford frontages on both streets without actually including the corner, added to which disadvantage these two streets were upon radically different grades—difficulties which skillful planning has not only overcome but even turned to good



Stucco, Marble and Polychrome Terra Cotta Are the Materials of the Facade



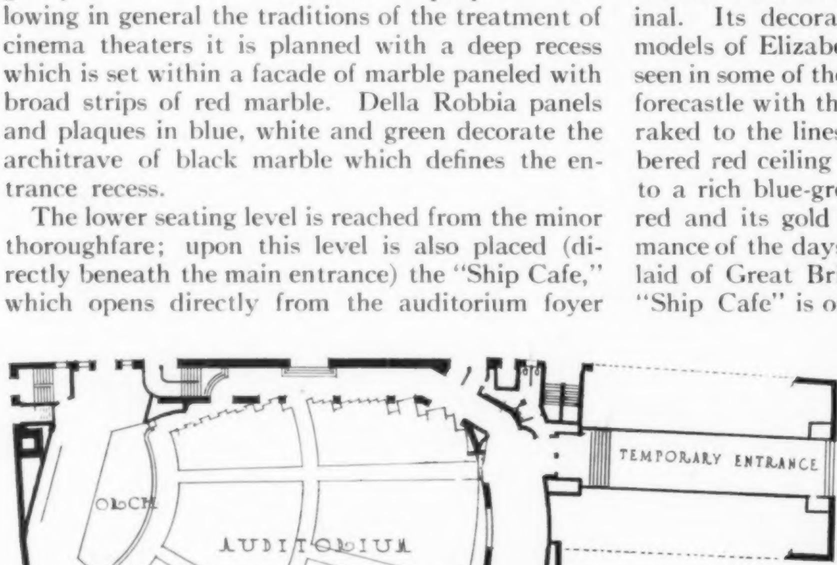
Entrance and Lower Balcony Plan



Upper Balcony Plan

account. The facades of the theater have been worked out in colored marbles and terra cotta which give to the exterior an appearance of festive gaiety which accords well with its purpose. Following in general the traditions of the treatment of cinema theaters it is planned with a deep recess which is set within a facade of marble paneled with broad strips of red marble. Della Robbia panels and plaques in blue, white and green decorate the architrave of black marble which defines the entrance recess.

The lower seating level is reached from the minor thoroughfare; upon this level is also placed (directly beneath the main entrance) the "Ship Cafe," which opens directly from the auditorium foyer which extends around this lower floor. This interesting restaurant is planned as a free rendering of the ward room of an eighteenth century ship of the three-decker type, in all the color of the original. Its decoration suggests the highly colored models of Elizabethan and Stuart ships which are seen in some of the English museums. Its windowed forecastle with the lion and the unicorn is correctly raked to the lines of the ship, and its heavily timbered red ceiling and wall posts painted and toned to a rich blue-green, its thin uprights of Venetian red and its gold and orange panels recall the romance of the days when the foundations were being laid of Great Britain's might upon the sea. The "Ship Cafe" is original in conception, homelike in the luxurious ease of its equipment, and warm and cheerful in its color.



Orchestra Floor Plan

The principal entrance, placed upon a higher level, leads to the upper floor or gallery of the theater proper which is arranged in the usual sloping fashion with a row of boxes or "loges" occupying the space nearest the stage. It is interesting to note that this cinema theater includes the usual boxes at the sides of the proscenium arch, although the present tendency in America is to omit them in the interest of the increased seating capacity which their omission would make possible. Owing to the form as well as the character of the building plot, the auditorium has been given a fan-shape, with each of 3,000 seats having an unob-

VIEW OF BALCONY AND UPPER PART OF THEATER

DETAIL OF PROSCENIUM AND STAGE

REGENT THEATER, BRIGHTON, ENGLAND

ROBERT ATKINSON, ARCHITECT

View of Box and Orchestra Foyers from Stage

structed view of the entire stage at all times.

Color is not often sufficiently employed in theaters of any kind, and yet nowhere more than in buildings devoted to public amusement is it so necessary to create the atmosphere of lightness and gaiety which the wise use of color gives. The auditorium of the Regent Theater affords a striking illustration of the value of mural decoration in a place of public amusement. In addition to the use of rich mural painting by Lawrence Preston about the proscenium arch the box foyer contains a series of "Columbine" panels by Walpole Champneys and three large allegorical paintings representing the "Spirit of the Carnival" by Walter Bayes, paintings subdued in color to agree with the architect's general scheme of color, but gay and fantastic and admirably adapted to the purpose which they serve, executed with a delicacy of touch, a subtle imagination and a mastery of color. When fully lighted the interior of the theater presents an appearance of great warmth, comfort and brilliance, the prevailing color being a rich orange upon which are panels in rich and contrasting colors which lead up to the increased richness of the decoration about the proscenium arch.

Directly above the main entrance to the theater and opening from the balcony foyer is what is known as the "Regent Restaurant," arranged in the manner of the Italian renaissance of the sixteenth century and lighted from the large windows within the recess of the facade. The ceiling is richly coffered, colored and gilded and the walls are covered with plain saffron colored hangings. The kitchens and pantries which serve the "Regent Restaurant" above the main lobby, and the "Ship Cafe" directly beneath the same lobby, are placed in the upper story of the building, connected with the restaurant floors by dumb waiters. The entire roof of the theater is arranged as a Winter Garden, commanding a view of the English Channel with the French coast plainly visible on clear days. This Winter Garden is arranged to seat over 1,000 persons, is provided with a spring floor for dancing and is adorned with pergolas, trellises and fountains.

The Regent Theater presents certain interesting details of engineering and involved calculations for girders to support a Winter Garden of 90-foot span, and the planning of enormous cantilevers to support the upper seating floor; the installation of a plenum heating and ventilating system, which meant forcing 100,000 cubic feet of warm air per minute into the structure, and with extraction ducts planned to direct the sound waves from the orchestra to the recesses of the auditorium.

Regent Restaurant on Balcony Promenade Level

Overlook Colony

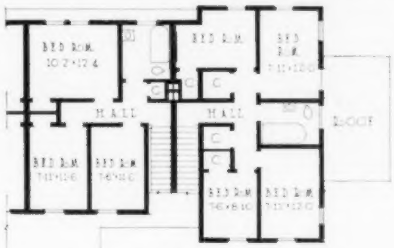
A HOUSING DEVELOPMENT AT CLAYMONT, DELAWARE

COFFIN & COFFIN, ARCHITECTS; JOHN NOLEN, LANDSCAPE ARCHITECT

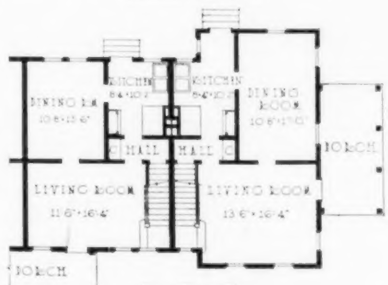
THE building of a town is a project that has an instant and attractive appeal to the architect. With a given plot of ground having interesting contours, wooded portions and possibly a stream or small body of water, the opportunity for play of the imagination is great. The problem of design, however, is no simple task; the pitfalls are many, and surprisingly disappointing results may occur in vistas, grouping, color, massing, scale and other important factors that cannot be readily foreseen in the single plane of a drawing. Town planning and housing involve many angles that are not encountered in the design of a single building, however complicated. It is, furthermore, a comparatively new service that architects are called upon to give; town planning in this country, particularly in connection with large groups of houses, was little thought of before attention was so forcefully directed to housing by war conditions.

It is perhaps not surprising that of the many developments created during the war, under both government and private auspices, it is only the occasional instance where success in all the elements of town planning is found. There is first required a spirit of intelligent co-operation between town planner and architect; one cannot dominate; concessions must be made by each with the final use and appearance of the completed village constantly in view. A real difficulty in many cases is the handling of very small individual units of building imposed by the general preference of Americans for individual, single-family houses. Because of economic conditions they must be made as small as possible, which hampers the architect not alone in the design of the individual house but in obtaining satisfactory grouping, because of the usual absence of any large masses.

The housing development of Overlook Colony, the property of the General Chemical Company at Claymont, Delaware, has many unusual points of interest about it that make it an excellent example of modern



Second Floor Plan



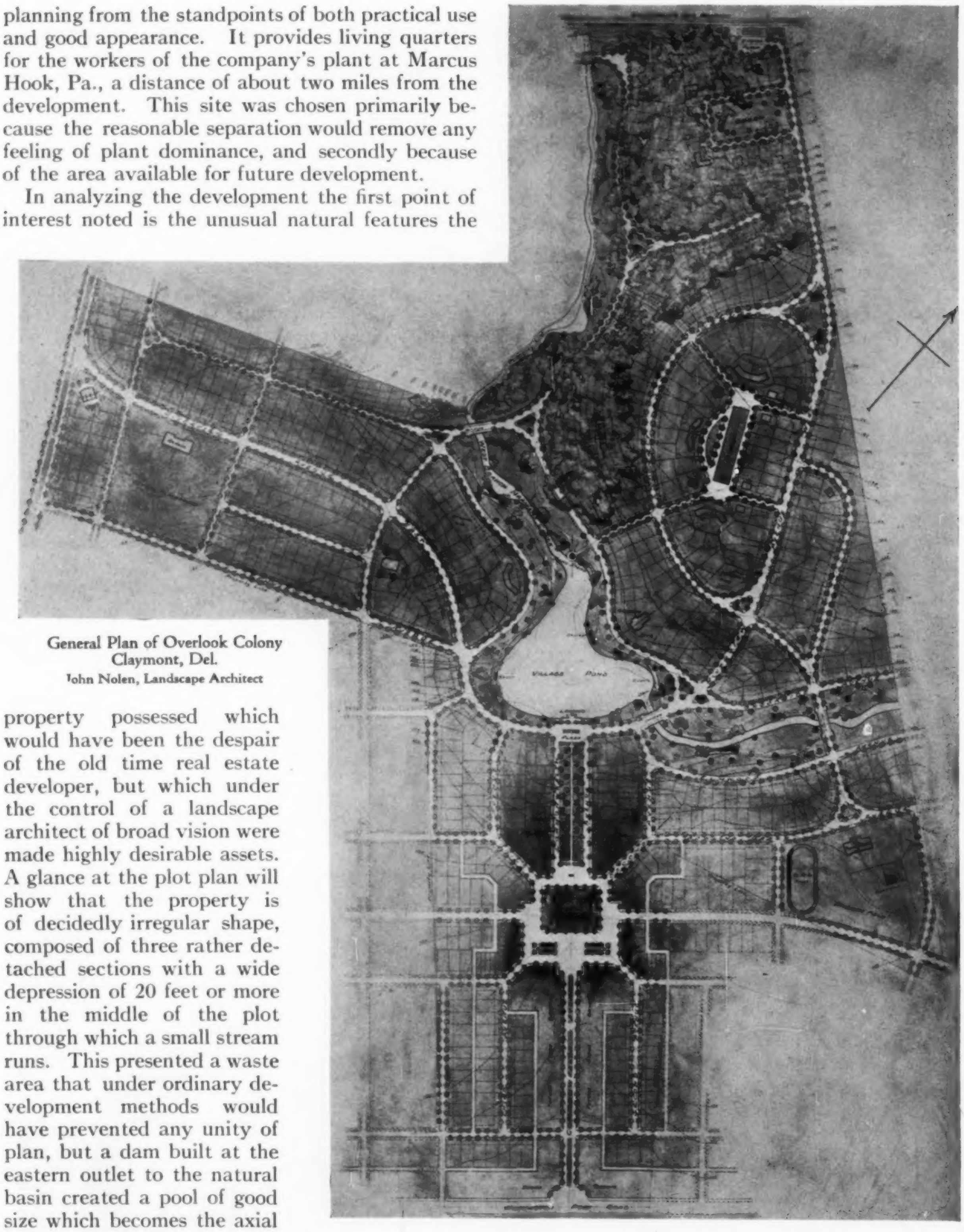
First Floor Plan

Inside and End Houses of Group Below

An Attractive Turn in the Road with a Group of Four Six-Room Houses at the Right

planning from the standpoints of both practical use and good appearance. It provides living quarters for the workers of the company's plant at Marcus Hook, Pa., a distance of about two miles from the development. This site was chosen primarily because the reasonable separation would remove any feeling of plant dominance, and secondly because of the area available for future development.

In analyzing the development the first point of interest noted is the unusual natural features the property possessed which would have been the despair of the old time real estate developer, but which under the control of a landscape architect of broad vision were made highly desirable assets. A glance at the plot plan will show that the property is of decidedly irregular shape, composed of three rather detached sections with a wide depression of 20 feet or more in the middle of the plot through which a small stream runs. This presented a waste area that under ordinary development methods would have prevented any unity of plan, but a dam built at the eastern outlet to the natural basin created a pool of good size which becomes the axial feature of the scheme; the roads skirt the stream and pond with the grassy slopes of the water side left free of buildings, thereby providing park space attractive in itself and accessible from all portions of the village. This community feature was furthermore obtained at the minimum of cost and without the sacrifice of any land that might have been profitably devoted to building sites. It is an excellent example of the transformation of a seemingly serious handicap into a community asset.



General Plan of Overlook Colony
Claymont, Del.
John Nolen, Landscape Architect

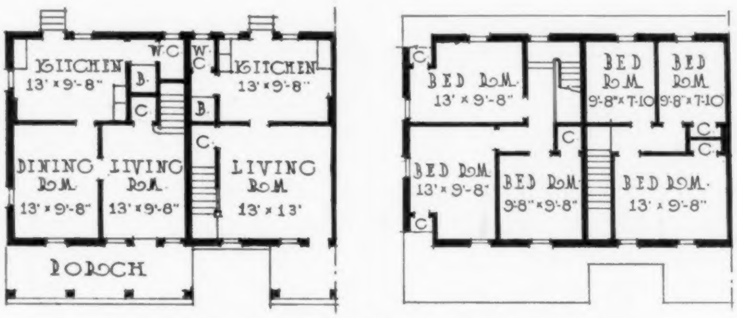
The topography of the land determined the character of lot divisions, the layout of streets and to a large extent the house types. The southern portion is comparatively level and has been arranged

200 THE ARCHITECTURAL FORUM May, 1922

with straight streets with diagonal roads leading to the central square and developed in block fashion with attached houses. The other portions are of more irregular contour and in parts are quite thickly wooded; the roads have been made to conform to the natural site conditions, and this area of more picturesque appearance has been reserved for single and semi-detached houses of larger sizes than those in the row development. The adoption of the attached house in blocks is a distinct architectural asset because of the greater unity afforded; it was chosen particularly, however, for its success in meeting local conditions; the people in this vicinity are accustomed to living in the row type of house such as is found in Wilmington and Philadelphia and it is therefore preferred by them; from the standpoint of cost it is likewise desirable because it is economical in regard to construction, use of land and improvements, besides being easier to heat and costing less to maintain.

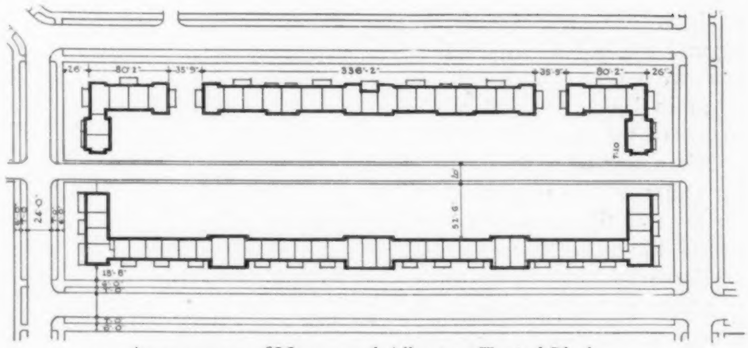
View at Intersection of Streets Showing Continuation of Houses

These houses were all built during the war period and a number of types of construction were used, due chiefly to the exigencies of building during that time. There are 196 dwellings, a community garage, a boarding house, and a community building which contains an auditorium, stores and office and apartment for the superintendent. Monolithic concrete construction was used for 75 of the houses. Ordinarily stone or gravel would have been employed as the coarse aggregate in the



First and Second Floor Plans of Typical Five-Room Houses

View of One-Half Block Facade of Five-Room Houses with Above Plan
Coffin & Coffin, Architects



Arrangement of Houses and Alley in a Typical Block

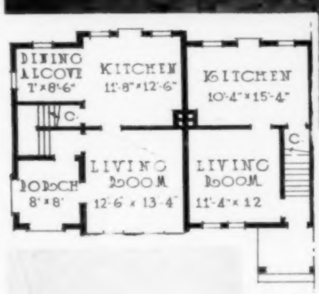
concrete, but due to difficulties involved in transportation the architects were obliged to turn to the use of soft coal cinders, a waste material at the company's factory, but which after sufficient testing was found to possess the requisite tensile and compression strength and low sulphuric acid content. The use of this material, enforced by circumstances, as so often happens, proved to be highly successful and offered advantages that would not have been present had the architects been unhampered at the beginning. The cinder aggregate made the concrete more porous than the ordinary variety, which eliminated the use of nailing blocks; the builders, therefore, merely nailed the interior furring strips directly to the concrete. On the exterior but one coat of stucco was applied and due to the porosity of the concrete perfect adhesion was secured. In addition to the 75 houses of concrete construction, 52 were fabricated of light pressed steel and then covered with stucco on metal lath, back plastered, the rest of the houses being of brick, hollow tile or frame construction.

In size these houses vary from four to seven rooms; all are provided with modern bathrooms and are heated by either hot air furnaces or by steam from a central heating plant. The larger houses were planned so that the stairs run parallel with the rake of the roof which enabled the architects without any loss of space to form the dormer windows and, therefore, secure the low appearance which is the distinctive feature of the houses and particularly appropriate to their location.

In planning Overlook Colony the architects have thought it wise to adhere to no one definite architectural style, feeling that such a development if carried out in one particular type would lack the spontaneity which affords an element of such interest in many small towns which have developed naturally.

The variety and interest of the buildings in Overlook Colony are due in a large measure to the moderate but pleasing use of color in the building materials. Most of the stuccoed houses are finished with a mixture of white cement and yellow sand, which gives rather a warm effect, and differences were obtained by several surface finishes. The stucco over the cinder concrete houses was applied in one coat in a very rough manner, showing the sweep of the trowel, and it proved more effective than the three-coat work where a smoother effect was secured. The horizontal siding of the wood houses was painted white with a small amount of yellow ochre added to counteract the cold blue-white of most newly painted woodwork. The vertical siding covered with battens is cypress and was stained a silver gray, which gives the appearance of wood which has weathered naturally and combines satisfactorily with the light toned stucco below. Trim on the houses entirely of stucco or brick is of varied colors—light brown, cream and light green predominating. The roofs throughout the colony are of slate, chiefly a fading sea green Vermont slate, although some houses are roofed with Vermont purple, others with Pennsylvania black and many with all three.

Detail of Entrance to Community Building
Coffin & Coffin, Architects



BLOCK OF FOUR- AND SIX-ROOM HOUSES

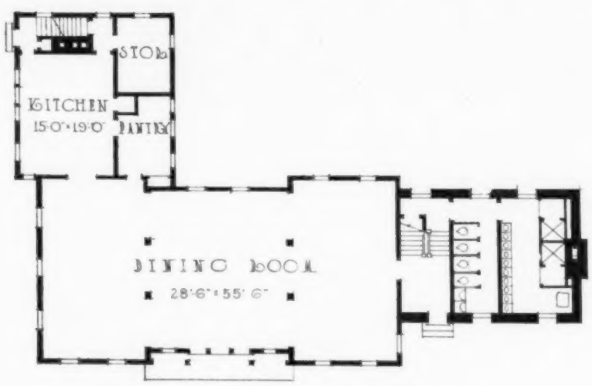
BLOCK OF FOUR-ROOM HOUSES

HOUSING DEVELOPMENT, GENERAL CHEMICAL COMPANY, CLAYMONT, DELAWARE

COFFIN & COFFIN, ARCHITECTS JOHN NOLEN, LANDSCAPE ARCHITECT

COMMUNITY BUILDING

BOARDING HOUSE

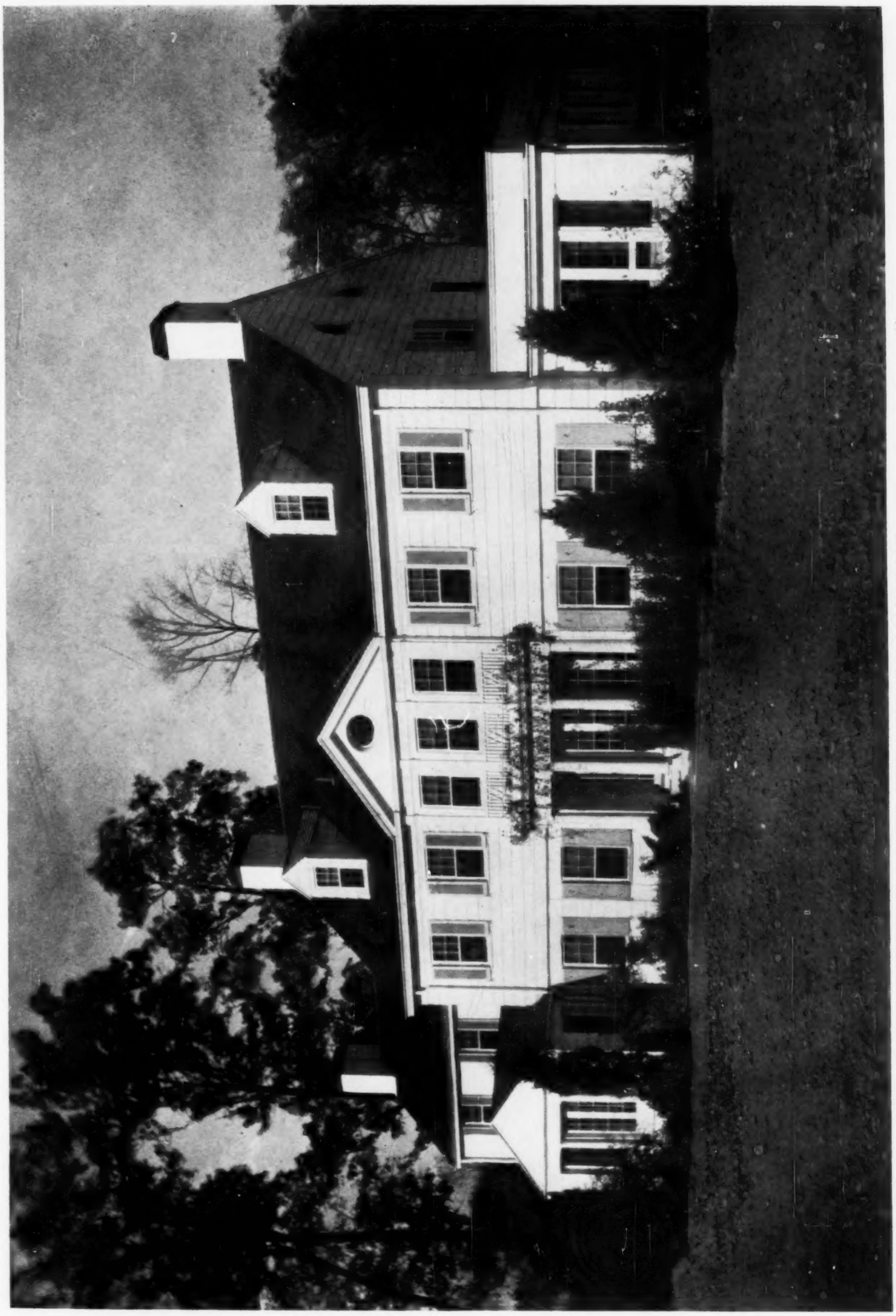


FIRST FLOOR PLAN

SECOND FLOOR PLAN

HOUSING DEVELOPMENT, GENERAL CHEMICAL COMPANY, CLAYMONT, DELAWARE

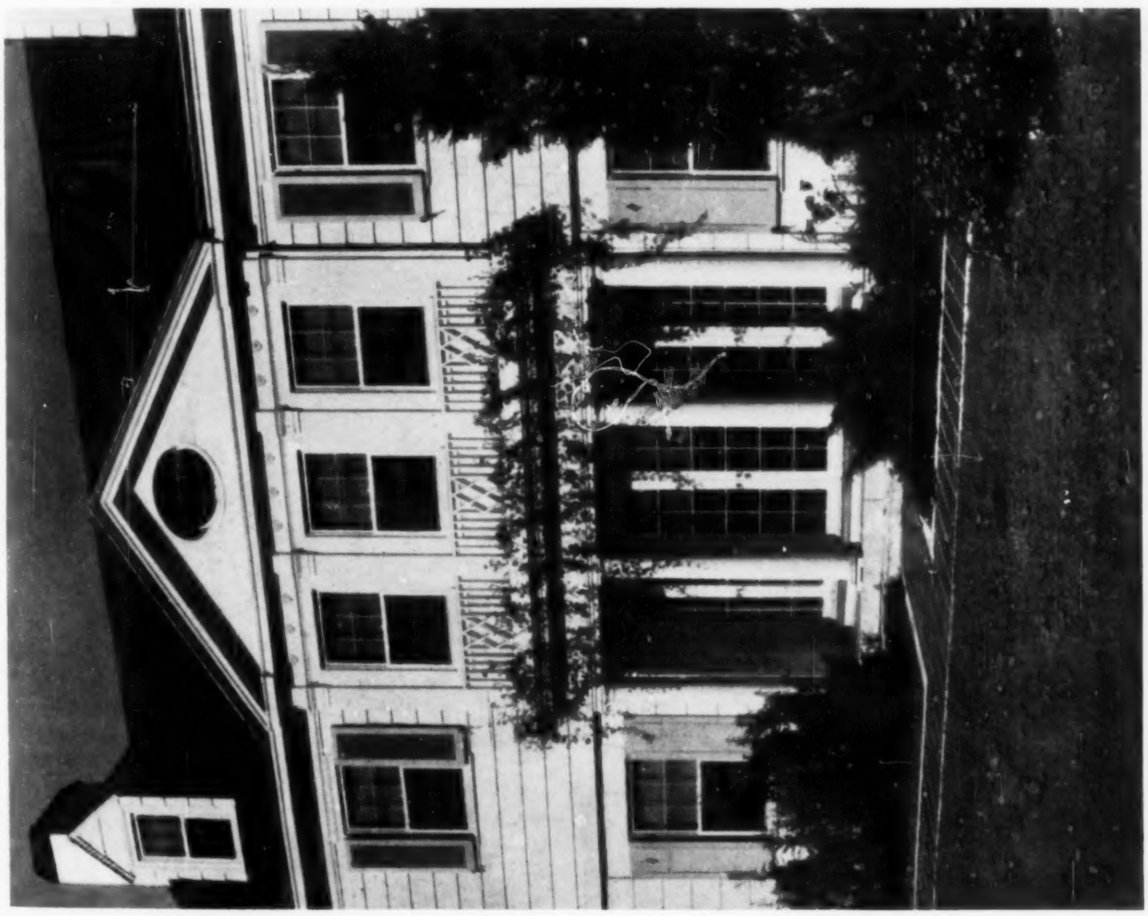
COFFIN & COFFIN, ARCHITECTS JOHN NOLEN, LANDSCAPE ARCHITECT



GENERAL VIEW OF GARDEN FRONT

HOUSE OF JAMES R. VAN DYCK, ESQ, HACKENSACK, N. J.

AYMAR EMBURY II AND LEWIS E. WELSH, ASSOCIATE ARCHITECTS

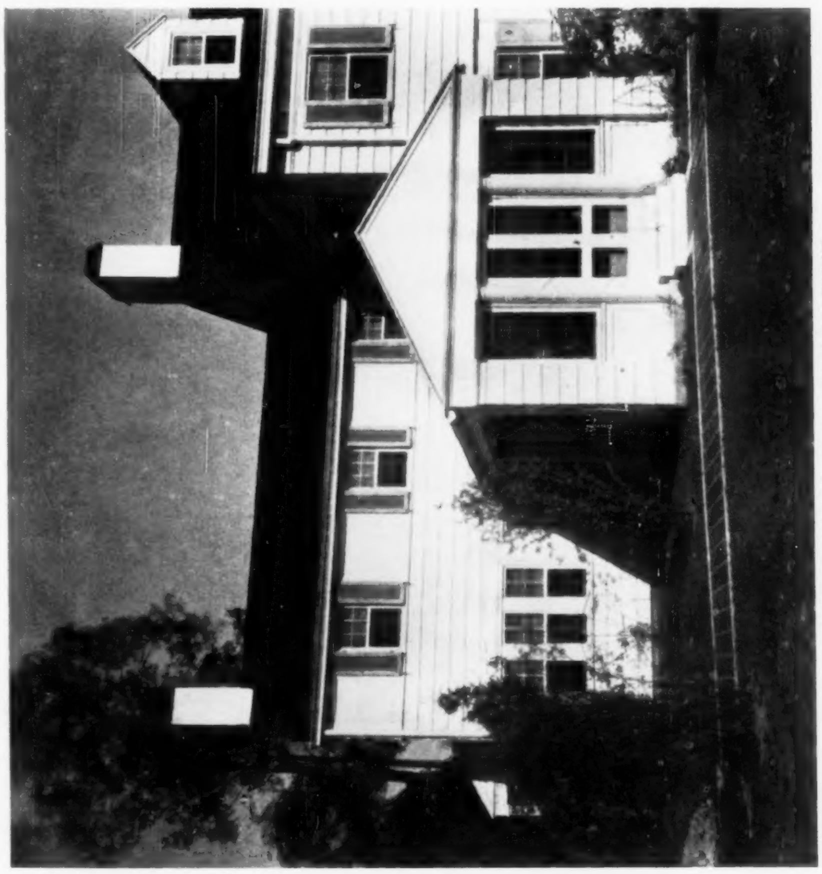


TWO DETAILS OF GARDEN FRONT

HOUSE OF JAMES R. VAN DYCK, ESQ., HACKENSACK, N. J.

AYMAR EMBURY II AND LEWIS E. WELSH, ASSOCIATE ARCHITECTS

VIEW OF ENTRANCE FRONT FROM DRIVE



BREAKFAST PORCH AND SERVICE WING

SECOND FLOOR PLAN

FIRST FLOOR PLAN

HOUSE OF JAMES R. VAN DYCK, ESQ., HACKENSACK, N. J.

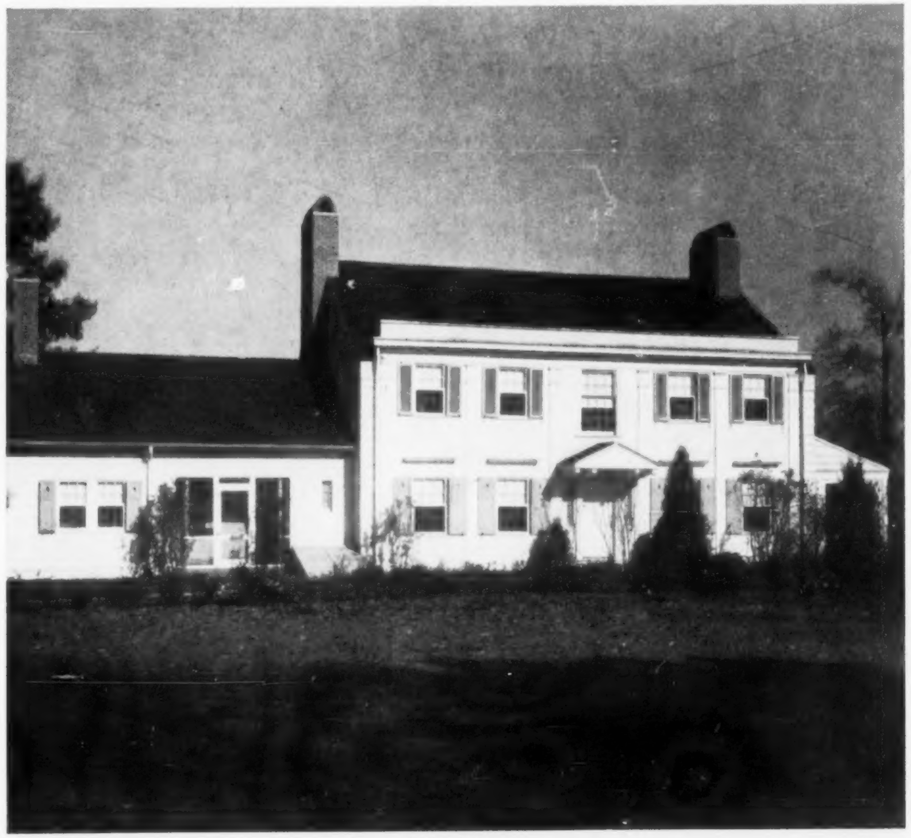
AYMAR EMBURY II AND LEWIS E. WELSH, ASSOCIATE ARCHITECTS

GARDEN FRONT

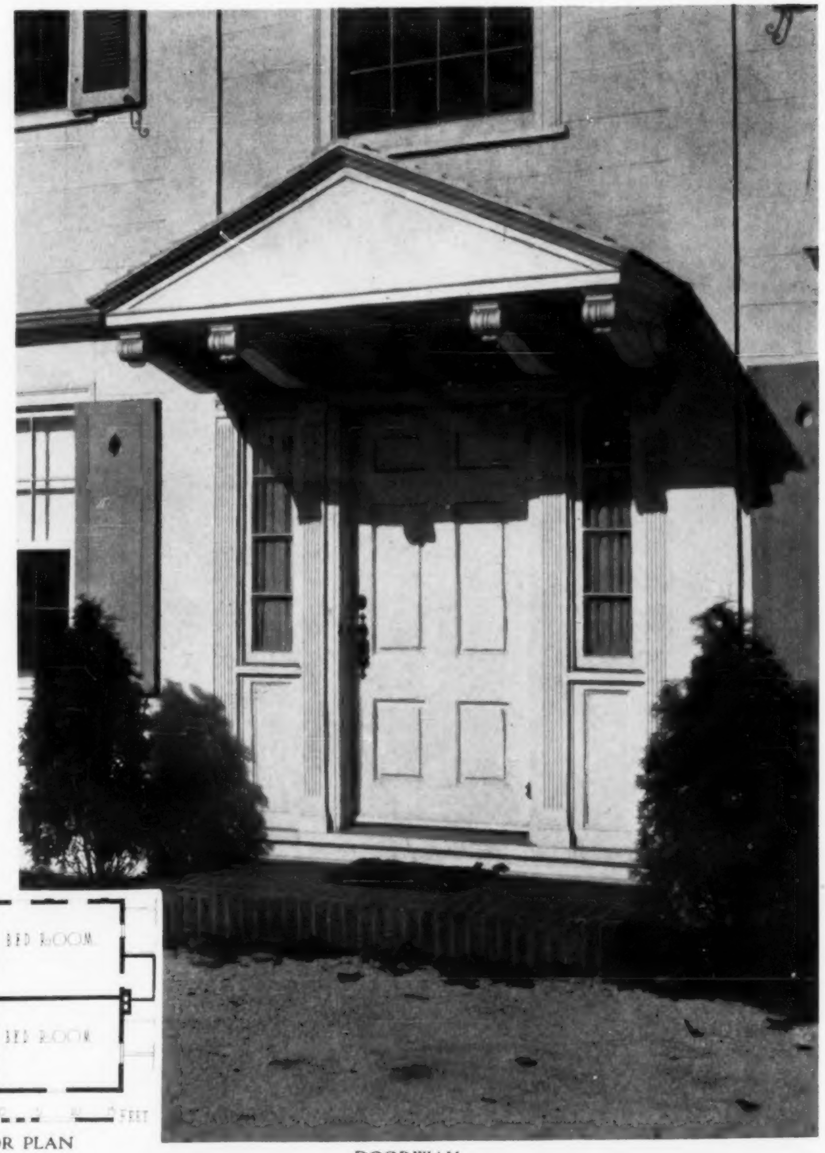
ENTRANCE FRONT

HOUSE OF CHARLES C. WORTH, ESQ., HACKENSACK, N. J.

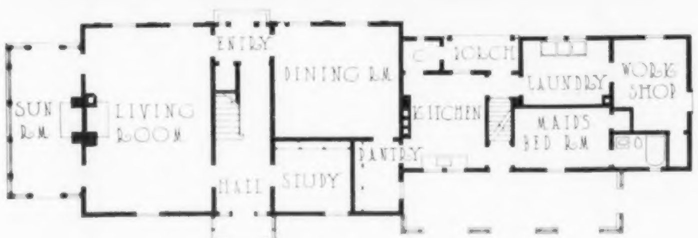
AYMAR EMBURY II AND LEWIS E. WELSH, ASSOCIATE ARCHITECTS



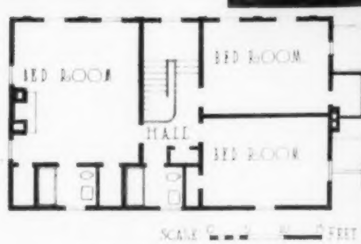
SIDE VIEW



DOORWAY



FIRST FLOOR PLAN



SECOND FLOOR PLAN

HOUSE OF CHARLES C. WORTH, ESQ., HACKENSACK, N. J.

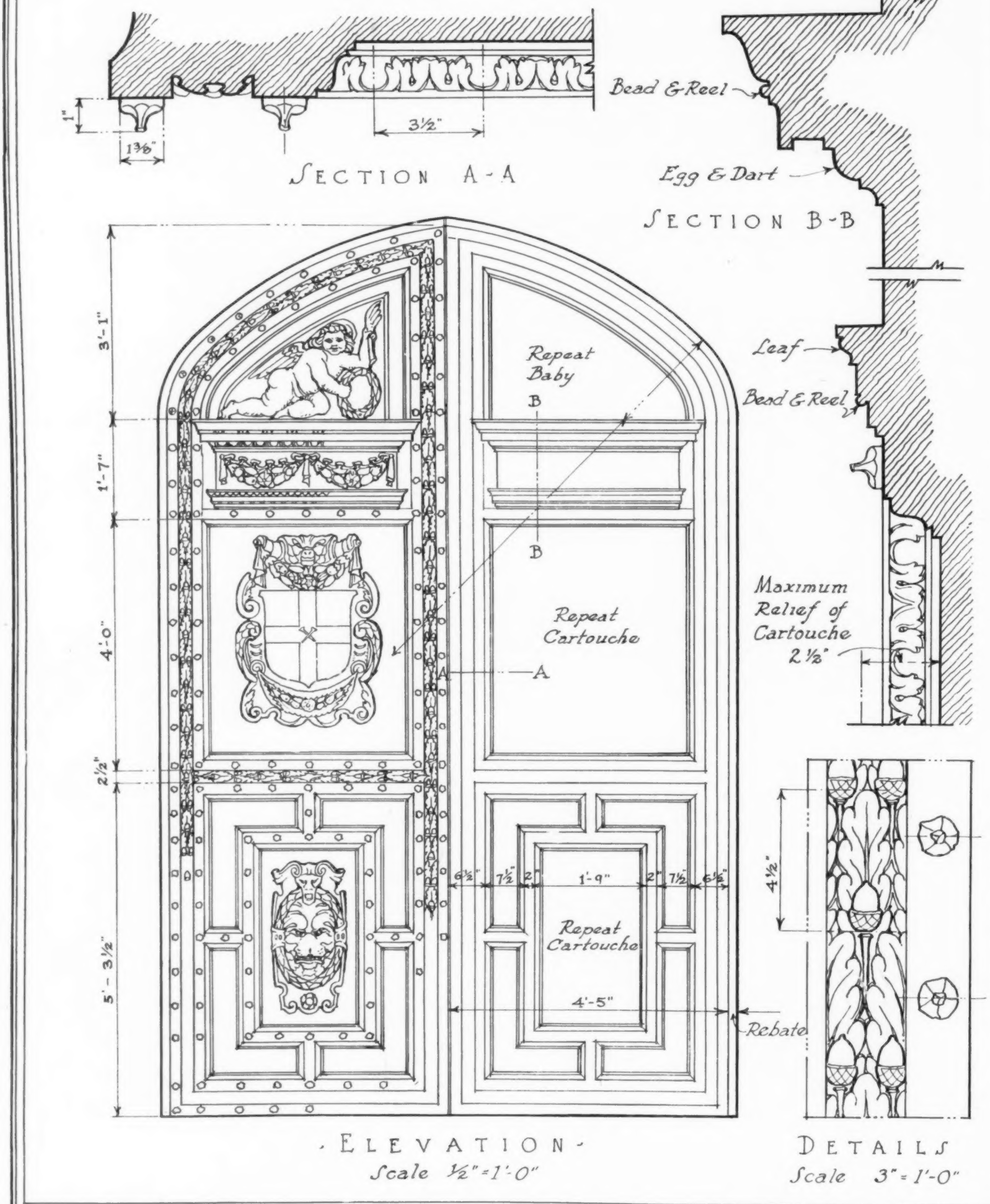
AYMAR EMBURY II AND LEWIS E. WELSH, ASSOCIATE ARCHITECTS

ENGLISH RENAISSANCE DETAILS

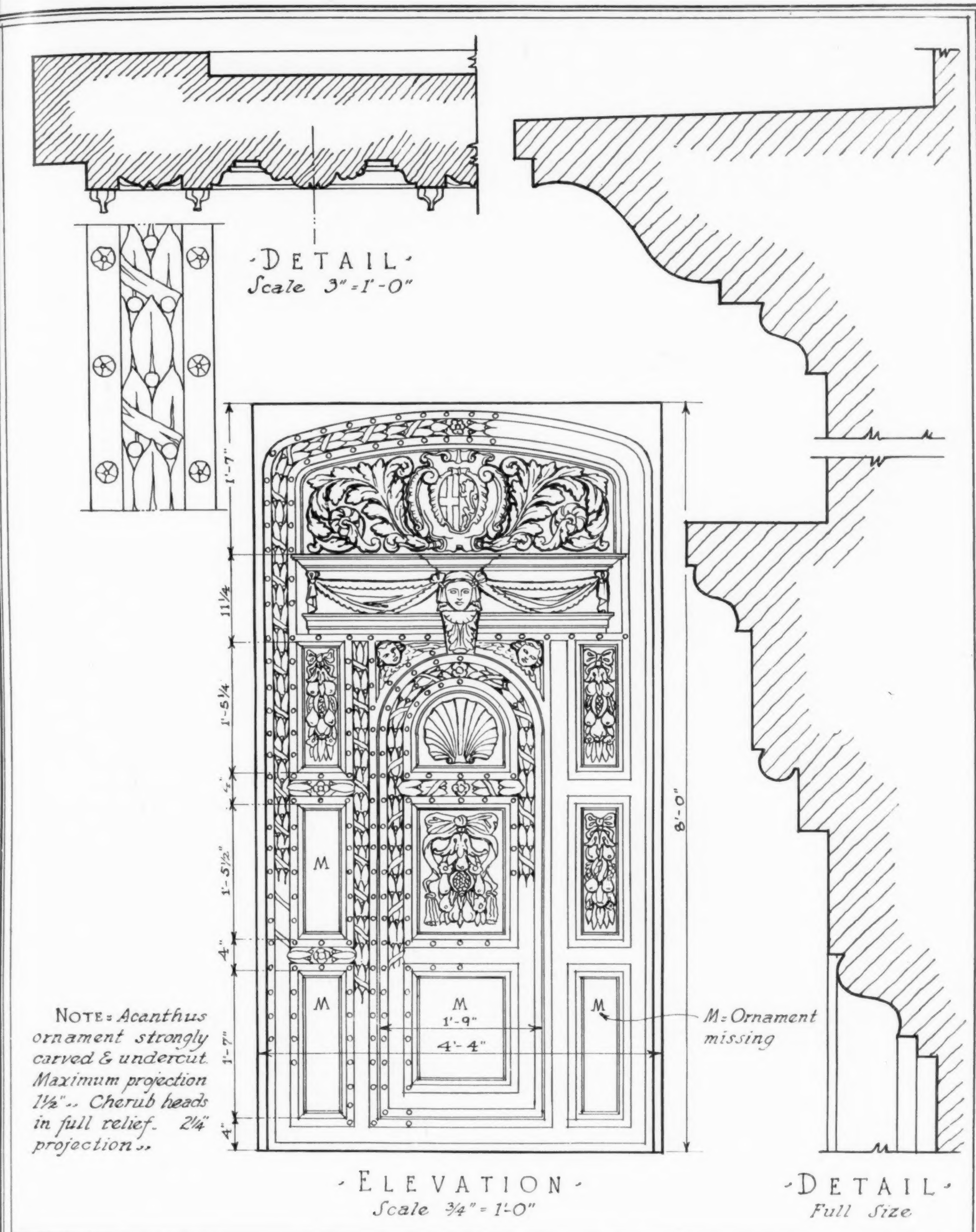
TWO MEASURED DRAWINGS BY HOWARD MOÏSE

OAK DOORS, CHRISTCHURCH GATE
CANTERBURY

CHRISTCHURCH GATE, the principal entrance to the precincts of Canterbury Cathedral, is a stone gate tower erected by Prior Goldstone in 1517. It is late Perpendicular in style and pierced in its lower story by two Tudor arches which are closed by oak doors of the period of the Renaissance. The doors are similar in character and were probably executed at the same time, but the smaller door has an earlier quality—a certain naiveté—in its design which makes it distinctly the more interesting of the two. The carving is robust in scale and treatment, the relief of the ornament in some of the panels being as high as 2½ inches. It is in this boldness in the relief of the carving that the chief interest of the larger door lies. The effect is very rich and the scale of the detail is admirably suited to the material and the general design.



ENGLISH DETAILS 1922	GREAT OAK DOORS CHRIST CHURCH GATE CANTERBURY	MEASURED and DRAWN by HOWARD MOÏSE



ENGLISH DETAILS 1922

·OAK·DOOR·
·CHRIST CHVRCH GATE·CANTERBVRY·

MEASVRED and DRAWN by HOWARD MOÏSE

EDITORIAL COMMENT

ARCHITECTS' POSITION QUESTIONED

FEW building failures have attracted so much and continued attention to themselves as the Knickerbocker Theater disaster in Washington. The profession of architecture has received its full share of criticism in the affair, and in some quarters the occasion has been seized upon to render some of the periodical condemnation that architects must endure. The building was designed by an architect, and the architectural profession is certainly big enough to meet any just criticism resulting therefrom; it is, however, absurd to condemn architects generally because of an isolated failure to provide adequate service, no matter how serious the consequences of the failure were. This building seems to have had the services of a varied lot of so-called experts, in the truly modern way—but, as is far too often the case with modern building, the controlling and uppermost factor was to cut cost. The architect from traditional association is looked upon as the man in control of the operation and the one on whom final responsibility rests. Yet we learn that the architect's fee was less than that considered necessary by representative architects and by the American Institute of Architects to insure adequate service to the owner. The architect too was influenced by the competitive spirit to reduce the cost of his service to a point which made it impossible for him to give the supervision that should be insisted upon if he is to be held in the position of final authority.

The *Engineering News-Record* in its issue of March 30 takes the occasion to ask a few pertinent questions of the profession:

> Ultimately a single brain and conscience, the personality of one man, stands back of any structure and guarantees its safety. The architect is that man in the case of buildings. Does he, in fact, assume and fully discharge this responsibility, or is it merely a matter of form? That is the outstanding query resulting from the Knickerbocker disaster, and it is squarely up to the architectural profession to answer it. If the architect's creative responsibility, and the associated guarantee of adequate construction, is a mere historic form, without substance, it is time that the facts were known to all the world and time that other means to guard public safety be provided. If the responsibility is still regarded as real, it is time that steps were taken to make it real. The point at issue is a condition such as is found in the Knickerbocker case—and such conditions, it must be admitted, are far from uncommon—where the architect gives careful attention to the externals, the appearance of his structure, but depends for the vital matter of making the structure safe upon an interested party, namely, a sub-contractor, without even an attempt to check the result. If the responsibility for the safety of a building may be thus divided and farmed out, what is left of the personal and competent answerability of the architect for his structure?

In the first place the *Engineering News-Record* takes an isolated example and on the strength of it makes an insinuation that it is typical of the profession which, of course, is no more fair than would be a similar condemnation of all general contractors.

The architect has a real function to perform, and furthermore one that can be performed best only by the architect. It is singular that so many interests connected with the building industry are so anxious to displace the architect; we are not so kind as to consider this manifestation all in the interests of the client; the position held by the architect is indeed an enviable one, and dominated by commercial ideals one that could be made very profitable. It is quite to the advantage of owners and building investors that the architect retain his traditional position, yet it would seem that he has before him a real job to defend his right to it.

The main difficulty is that many architects are not so well aware of the strategic value of their position as some of their critics. They have permitted steadily lower values to be placed on architectural service till the prospective builder considers the obtaining of plans one of his simplest problems; they can be had from the contractor, or with such keen competition among those eager to serve him the owner can name his own price and generally find a man who calls himself an architect ready to take the job.

There is the real difficulty; other factors that may be pointed out are simply effects of this cause. The architect who has a proper regard for his profession will not prostitute it by affecting to provide a service which any honest man knows cannot be given on an economic basis except for fair pay.

Registration has been suggested as a remedy; it may be effective in disqualifying those who are incompetent, but with the passion of our law makers for "safe legislation" the others will be permitted to continue their careers, possibly lacking the prestige of a title. Registration will not compel a man to demand remuneration comparable with the services expected of him, and the competent can reduce the amount of inspection just as readily as the incompetent if he is forced to make ends meet.

The profession is not without obligation in the matter of improving the quality of architectural service. Legal restrictions will help, but in our opinion the object can best be accomplished by every architect who has the welfare of his profession at heart, extending aid through his professional societies to those who are classed as members of the profession from the public point of view, and inspiring in them respect for their calling which is all that is needed to justify the propriety and good business of the architect's traditional position.

DECORATION *and* FURNITURE

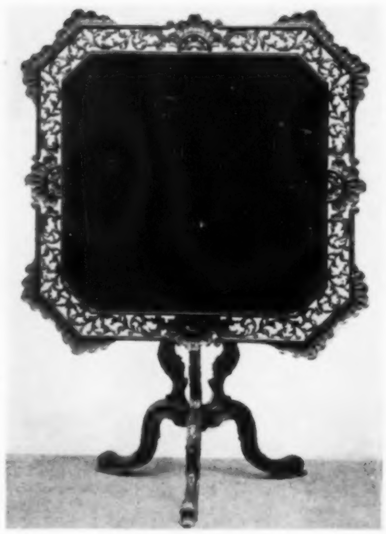
A DEPARTMENT
DEVOTED TO THE VARIED
PROFESSIONAL & DESIGN INTERESTS
WITH SPECIAL REFERENCE TO
AVAILABLE MATERIALS

Selected Group of Furniture in Chippendale Style

With Adaptations of French Motifs

Detail of Chair Back in Chippendale's French Style with Bow Top

Chair Backs, Courtesy of Irving & Casson—A. H. Davenport Co.



An Example of Large Tripod Table with Elaborately Carved and Pierced Border

Courtesy of Somma Shop,

Particularly Graceful French Type Ribbon Chair Back with Broken Scroll Top

Courtesy of New York Galleries

A Modern Arm Chair Based on English Version of French Louis XV Style. The Arms Retain English Note

An Original English Chair of Great Refinement in Line and Detail, Closely Following Louis XV Design

Courtesy of Wm. Baumgarten & Co.

Excellent Example of an Original Chippendale Piece Showing His Handling of Small French Bureau

Courtesy of Wm. Baumgarten & Co.

This Piece Exhibits the Characteristic Rich Carving of the Period. Wooden Tops Generally Distinguish English Bureaus from the French, Who Preferred Marble

French Influence on Furniture of Chippendale School

By ROBERT L. AMES

THE enthusiasm with which the architects of the Georgian period followed the principles of the great Palladio in designing their stately, well balanced interiors did not prevent their favoring considerable flexibility in the designing of furniture. The heritage of English design which they found at hand they elaborated and refined, and to this heritage there were added motifs adapted from Gothic, Chinese and French sources. The use of Gothic ornament was something of a cult, affected by but few and quickly abandoned as being manifestly unsuited to English use; the adaptation of Chinese motifs was far wider as applied to furniture, and its use for other accessories has lasted until today; the French, however, was destined to exert a stronger influence than either upon English furniture. The period called for luxury, and English royalty and nobility had as a powerful object lesson the splendor of the French court, where the magnificence of Versailles demanded furniture and other accessories which taxed the ingenuity of even the French designers.

Details of Two English Chair Legs Showing Motifs Derived from the French

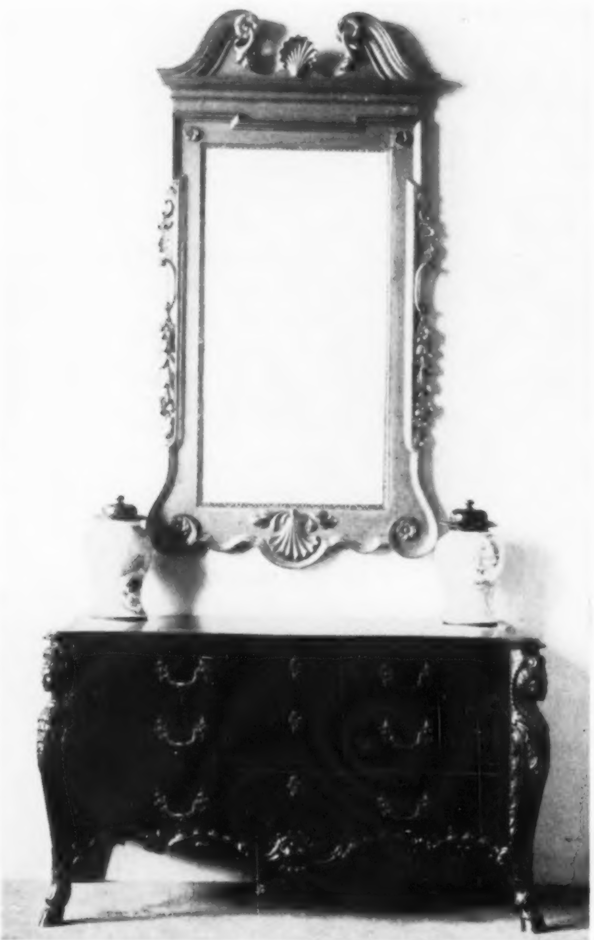
Toward the middle of the eighteenth century the English following of French fashions in dress, furniture, ornament and gardening amounted to a mania, and the English cabinet makers, of whom Chippendale was the most eminent, supplied the demand for furniture in the French taste with an Anglicized version of fashions which prevailed across the channel, in which the spirit of luxury was preserved while considerable modification was made in the form, the chief point of difference being the omission of ormolu mounts, the lack being supplied by the English cabinet makers in the wide use of carving.

Chippendale's vogue was the result of his being possessed of unusual business acumen and considerable skill as a designer and craftsman; the one enabled him to appreciate and cater to the fashion of the times and the other to satisfy the demand with furniture which would also increase his prestige as a cabinet maker. His following of French design was particularly marked in his chairs, sofas, commodes and mirror frames and in his girandoles or candle brackets. While his designs show that he followed and adapted the styles of both Louis XIV and Louis XV, his dependence was less upon the heavy, massive manner of the earlier reign and far more evident in his lavish use of rococo. English furniture makers even before the time of Chippendale had lightened the heaviness of the vase-shaped splat of the Queen Anne chair, but now the chair was given the utmost delicacy and grace, and in the more pronounced following of the French the splats were carved

Modern Reproduction of English Ribbon Back Chair in French Style
Courtesy of Irving & Casson—A. H. Davenport Co.

Side Table in Chippendale Style with Restrained French Detail
Cooper-Williams, Inc., Decorators

An Original Chair in Chippendale's French Style from Metropolitan Museum



A Mahogany English Commode Showing Excellent Type Rococo Ornament at Base

Courtesy of W. & J. Sloane

out with designs of fluttering knots of ribbon, the same motif, or some other detail equally graceful, being carved out upon the narrow framework about the seat and continued down the slender cabriole legs which terminated in scroll feet, the entire chair possessing an almost feminine delicacy, made practical only by Chippendale's skill as a cabinet maker in giving it the necessary structural strength. Chippendale's chairs illustrate more fully than his other furniture the extent of his indebtedness to French design. To the form of the seat itself he sometimes gave a slightly serpentine front, and two added details are his use of upholstery upon the arms of his armchairs and the design of the arm itself which was given a graceful, sinuous curve, following Louis XV forms, often continued in flowing lines into the cabriole leg below.

In his stuffed sofas Chippendale followed the French types almost literally; the backs are given a bow shape or else they consist of single long, convex curves, the ends turning outward in the form of a C-curve above a short cabriole leg. Ordinarily the front would be given four legs, the outline of the seat being given the usual C-curve and adorned with *coquillage*. As a variation to this type of sofa he used a more reserved Louis XIV type with straight, tapering legs attached to a straight front, the austerity of the lines being relieved with festoons of drapery carved from the wood. Chippendale's sofas were often designed with a bolster and pillows at each end and cushions at the back. His sofas as well as his chairs were covered with tapestry, damask, needlework or else with red morocco which he especially recommended for his ribbon-back chairs, upon which he based his chief claim to fame, and these coverings were held in place by brass nails, sometimes in one row and sometimes in two, set closely together, which gave an added suggestion of luxury when mahogany was the wood used. The wide use of the lion mask or of human masks upon the knees of cabriole legs of chairs, and of tables as well, was adapted from the French of Louis XIV.

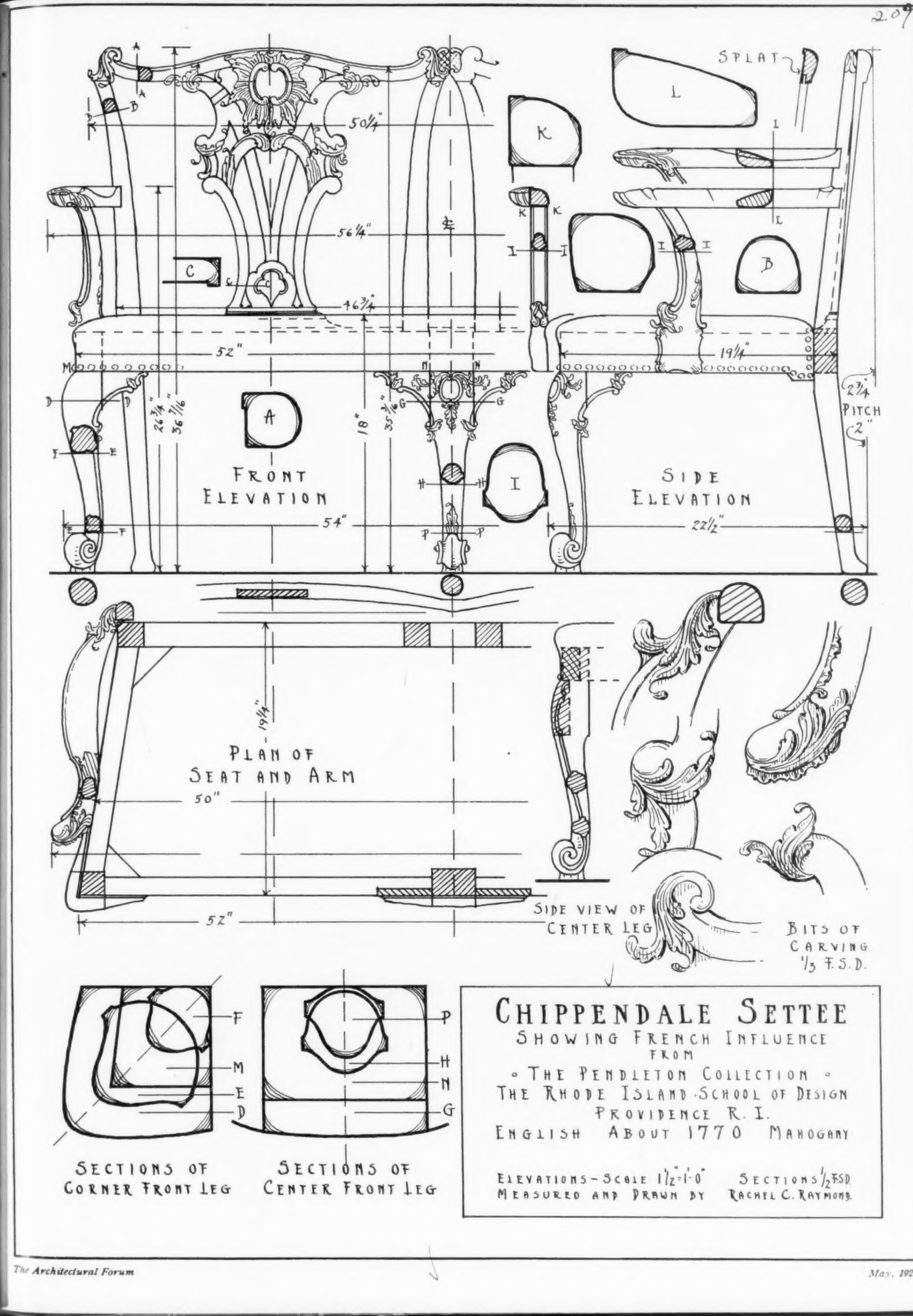
Chippendale was particularly successful with his chests of drawers mounted upon low cabriole legs, which in his book he refers to as "French commode tables." They display *bombé* and other forms of front and are closely patterned after the French

A Sofa in Chippendale Style Showing Typical Mask Carving and Scroll Feet on Legs; Covering in Needlework

Courtesy of Bristol Company

Modern Arm Chair Designed on Restrained French-English Lines

Courtesy of Nahon Co.


SPLAT
50¼"
56¼"
46¾"
52"
19¼"
2¾ PITCH 2"
18"
26¾"
36 7/16"
35 3/16"
FRONT ELEVATION
SIDE ELEVATION
54"
22½"
PLAN OF SEAT AND ARM
19¼"
50"
52"
SIDE VIEW OF CENTER LEG
BITS OF CARVING 1/3 F.S.D.
SECTIONS OF CORNER FRONT LEG
SECTIONS OF CENTER FRONT LEG
CHIPPENDALE SETTEE
SHOWING FRENCH INFLUENCE
FROM
THE PENDLETON COLLECTION
THE RHODE ISLAND SCHOOL OF DESIGN
PROVIDENCE R. I.
ENGLISH ABOUT 1770 MAHOGANY
ELEVATIONS - SCALE 1½" = 1'-0"
SECTIONS ½ F.S.D.
MEASURED AND DRAWN BY RACHEL C. RAYMOND.

Dining Room with Dignified Arrangement of English 18th Century Furniture. Side Table Modeled on Chippendale's Handling of Louis XIV Motifs. Francis H. Bacon Co., Decorators

shapes. Sometimes doors were used instead of drawers, which brought a closer conformity to the commode form. His heavier pieces of this kind, while often retaining the swelling or serpentine front, rest upon moulded feet of ogee shape instead of upon cabriole legs, and the corners are canted and carved in pilaster forms. While his work is associated in the popular mind chiefly in connection with the use of mahogany, much of Chippendale's furniture was gilded in the French manner and sometimes painted. The French interior of the period was rich and sumptuous, color being used upon the furniture no less than upon walls, and color was also used in a restrained form upon the furniture which English cabinet makers were adapting from the French.

For his mirrors and girandoles Chippendale adopted the extreme of French *rocaille* motifs, based upon the style popular during the reign of Louis XIV and abounding in use of trophies of war or the chase, ruined columns and musical instruments, redeemed, as his mirrors almost invariably are, by a grace and beauty of form which atone for much excess of ornament. His mirrors and girandoles were carved from pine and heavily gilded, with certain portions burnished. Chippendale's skill in the use of French motifs is especially apparent in his simpler and more restrained designs. Being the foremost furniture maker of his time and patronized by a fashionable clientele during a period when luxury and ostentation were universal, he probably felt the necessity of supplying what conditions demanded, often perhaps against his better judgment.

Someone has said that the three factors which made famous the reign of George II were civil peace, mahogany and Chippendale, and it is certain that neither the first nor the second could have produced the result without the help of the third. Much of his work exhibits a strange *mélange* of motifs wholly unrelated, but fused by his genius for design into a form which is but rarely incoherent. His influence upon furniture making is still strong after almost two centuries, and the type of furniture known by his name seems destined to popularity as long as the furnishing and decoration of houses is practiced.

The usefulness of adaptation from French sources by modern architects and decorators, like use of Chinese motifs, lies in giving greater richness and freedom to Georgian interiors, which are sometimes in need of this modifying influence in preventing stiffness or over-reserve. It supplies a means of adding variety without introducing confusion.

Chippendale Settee Showing French Influence
From the Pendleton Collection, Providence; Measured Drawing on Preceding Page